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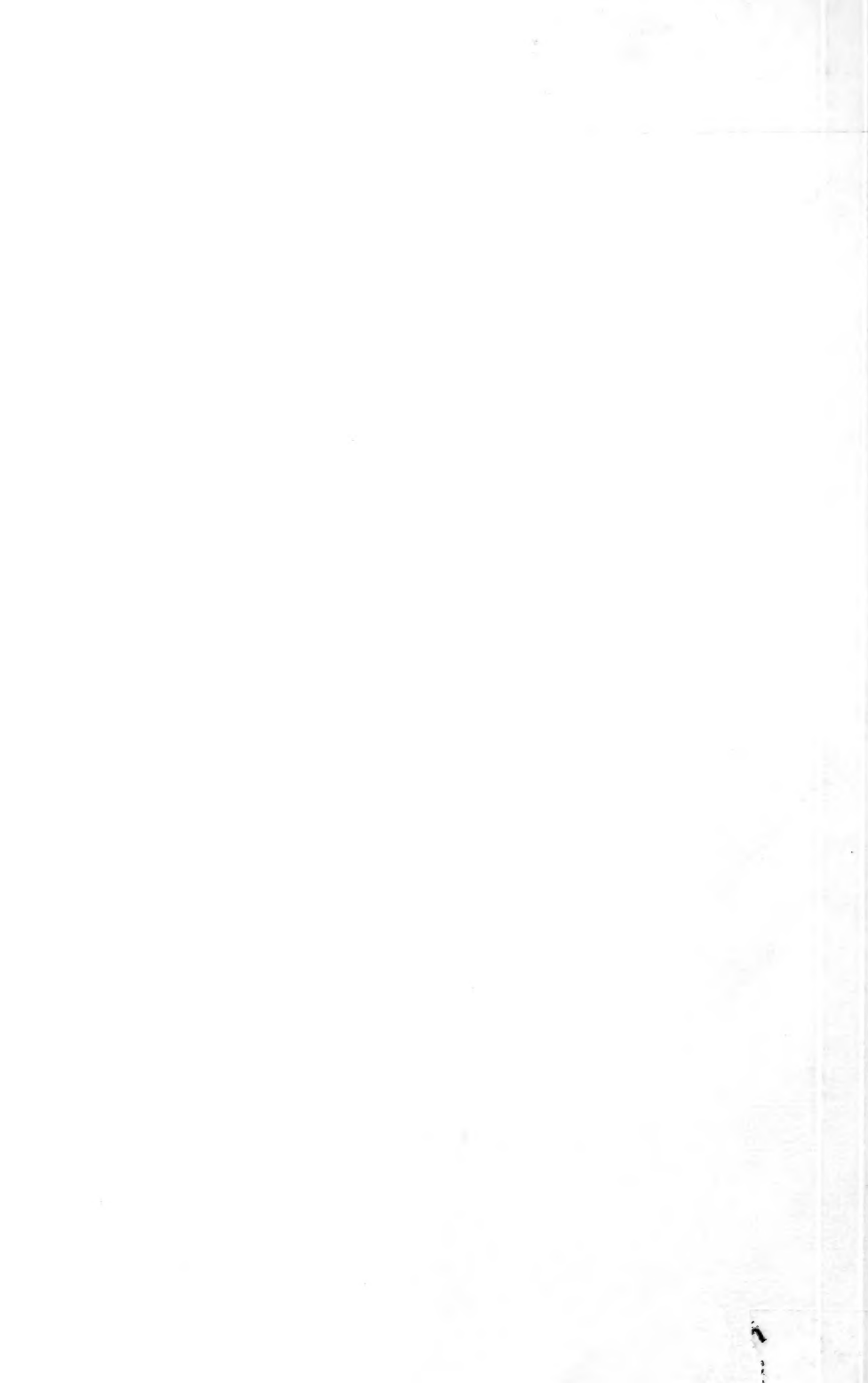
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# The
# TIMBER RESOURCES
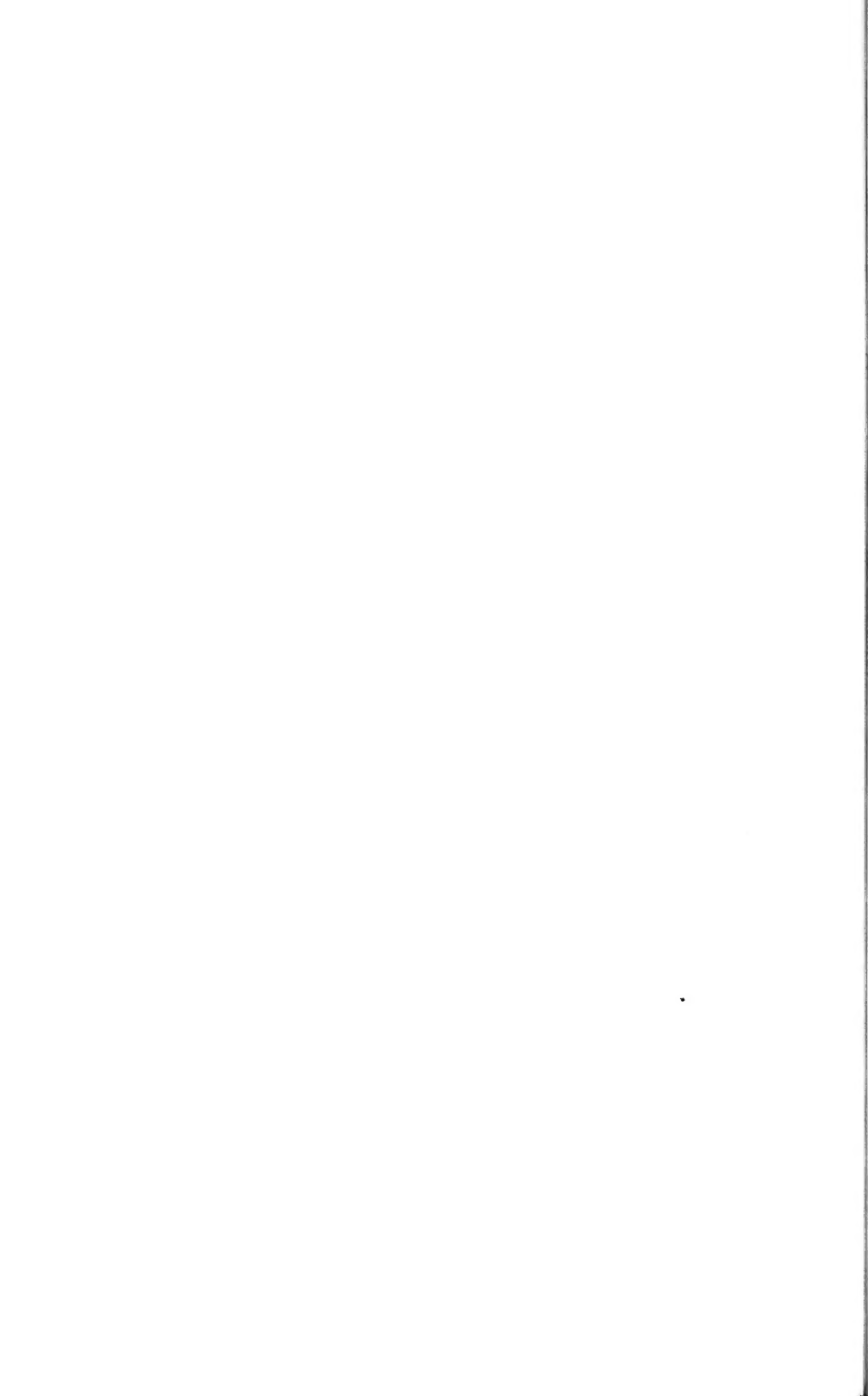## of OHIO
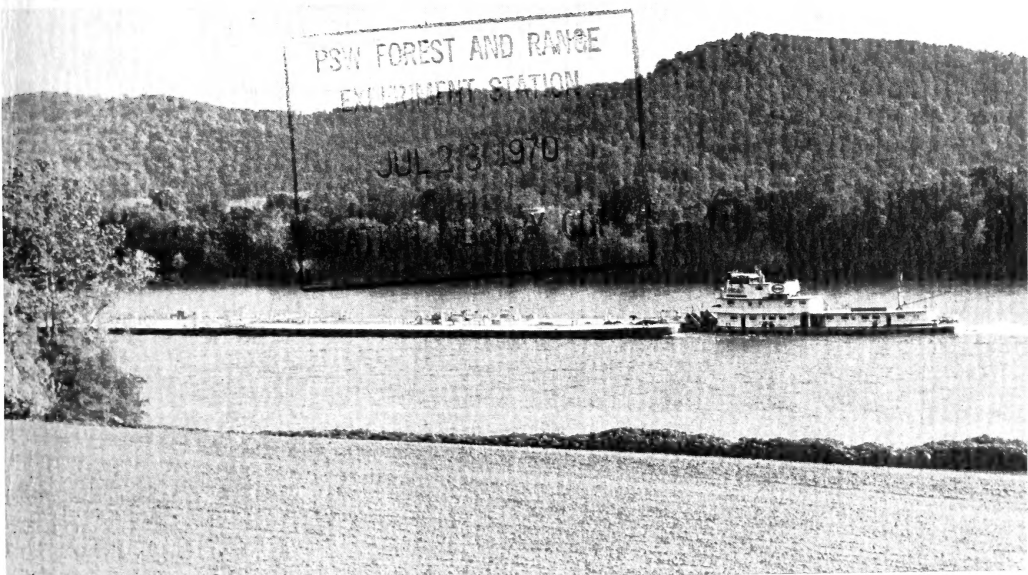
# FOREWORD

UNDER THE AUTHORITY of the McSweeney-McNary Forest Research Act of May 22, 1928, and subsequent amendments, the Forest Service, U. S. Department of Agriculture, conducts a series of continuing forest surveys of all states to provide up-to-date information about the forest resources of the Nation.

A resurvey of the timber resources of Ohio was made in 1966 and 1967 by the Northeastern Forest Experiment Station, approximately 16 years after the initial forest survey.

In this resurvey, the State of Ohio provided an appropriation of $75,000 to intensify the forest survey in the heavily forested portions of the State. Also, the Ohio Department of Natural Resources, Bureau of Forestry and Reclamation, assisted in the collection of data on timber removal and timber-products output, as well as through consultation with Forest Service personnel.

Carl E. Mayer, project leader, directed the resurvey. Joseph E. Barnard was in charge of computing and tabulating all inventory data, including those for the Wayne National Forest, which were collected by personnel of the Eastern Region of the U. S. Forest Service. Paul S. DeBald and James T. Bones collected and compiled the data on timber removals, with the assistance of the Ohio Division of Forestry and Reclamation personnel. Teresa M. Bowers assisted with the compilations and checked the statistical data. The field work was completed in December 1967.

The Agricultural Stabilization and Conservation Service provided up-to-date aerial photographs for use in this resurvey.

This report summarizes the timber-resource situation and the changes that have taken place since the initial survey. Trends in the supply of timber for forest-based industries are pointed out, and projections of future timber supply are made.

In this survey, some of the initial ground plots were remeasured to provide estimates of net annual timber growth and estimates of land-use change, and to update the initial forest-inventory volume. To develop an independent second estimate, newly established and previously unmeasured ground plots were measured. These two estimates were weighted and combined to provide the current estimates of forest area and timber volume.

Sampling errors, which indicate the reliability of the estimates, are shown for most of the totals of breakdowns of the new estimates. Users of these resource data are cautioned to read carefully the definitions of forest-survey terms and the section on the reliability of the estimates in the appendix of this report.

# The
# TIMBER RESOURCES
# of OHIO

### by Neal P. Kingsley
### Carl E. Mayer

## The Authors

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# Contents

# IMPORTANT FINDINGS

I N THE 16 years that have elapsed since the report on the first forest survey of Ohio was published in 1952, a number of important changes have taken place. Here briefly are some of the more important findings of this second forest survey of the Buckeye State:

Commercial forest land in Ohio now totals 6.3 million acres—up 17 percent from 1952.

Farmers now own 42 percent of the forest land (56 percent in 1952). Other private owners own 52 percent (38 percent in 1952). Only 6 percent is publicly owned.

An unusually high proportion of Ohio's forest land is in sapling-and-seedling stands—56 percent of the commercial forest land.

The area in the oak-hickory forest type declined slightly, while the area in the elm-ash-red maple type was unchanged. But the area in maple-beech-birch, oak-pine, and softwoods increased substantially.

The volume of growing stock in Ohio increased 31 percent. In 1952 growing stock totaled 3.2 billion cubic feet; by 1968 it totaled nearly 4.2 billion.

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✳ The volume of sawtimber in Ohio increased 30 percent. In 1952 sawtimber totaled 11.2 billion board feet; by 1968 it totaled 14.6 billion.

✳ Only one-third of Ohio's sawtimber is in grade 1 and 2 sawlogs.

✳ Net annual growth exceeds timber removals. Growth equals 3.2 percent of the growing-stock inventory while removals equal 1.7 percent.

✳ By 1966 the output of timber products from Ohio's forests had risen to 119.4 million cubic feet from 64.5 million in 1952.

✳ A better distribution of stand - size classes is a major timber management need in Ohio.

# THE BACKGROUND

## Ohio Once 95 Percent Forested

French Jesuits, trappers, and explorers were probably the first white men to venture into what is now Ohio. For a century France and Britain battled for control of the region. Finally the British victory of 1763 put Ohio in the domain of George III. But Ohio was not to remain long under Crown rule. After the victory of 1763, American colonists began slowly moving into the region. After the Revolution, a destitute new nation repaid many of its fighting men with grants to land in the Ohio country; and the pace of migration began to quicken. But this new land was still peopled by hostile Indian tribes until in 1795 "Mad

uted over the State. The Hill Country showed a 32-percent increase since 1952. Here commercial forest land area rose from 3,310,000 acres (38 percent of the area in 1952) to 4,381,300 acres (50 percent of the area in 1968). In contrast, the Glaciated Region lost nearly 7 percent. Here commercial forest land totaled 1,947,900 acres in 1968, down from 2,086,000 acres in 1952.

The Hill Country covers only slightly more than one-third of Ohio's total land area. This fact, coupled with the 32-percent increase in commercial forest land in the Hill Country, sharpens the contrast between the Hill Country, an essentially forested region, and the Glaciated Region, an open and predominantly agricultural area.

The Glaciated Region contains most of Ohio's major urban areas. Like most urban areas, those in Ohio have been spreading out from the core cities. This urban sprawl, plus the construction of several major highways, has served to offset any increase in the forest land area of the Glaciated Region.

By comparing the area of commercial forest land in the two regions in 1952 and 1968 it is possible to see just where forest land has increased most. The most substantial and significant increase occurred in the East-Central Unit of the Hill Country. The area of commercial forest land in this unit rose from 29 percent of the land area in 1952 to 46 percent in 1968.

Of Ohio's 88 counties, 33 are less than 10 percent forested. All of these counties are in the Western Unit. No county outside the Hill Country, except Geauga County is more than 30 percent forested (fig. 5). Only 15 Ohio counties are more than 60 percent forested.

## Area Owned by Farmers Drops

The percentage of commercial forest land owned by farmers dropped 15 percent. In 1952 farmers owned 3,047,000 acres—about 56 percent of Ohio's commercial forest land. By 1968 this percentage had dropped to 42 percent or 2,687,900 acres.

In the Hill Country 38 percent—1,673,000 acres—of commercial forest land is owned by farmers. By contrast, in the Glaciated Region 52 percent of that area—1,014,900 acres—is owned by farmers.

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Figure 5.—Twenty-six of Ohio's 88 counties have 30 percent or more of their land area in commercial forest land.

The 14-percent decline in farmer-owned forest was offset by a 14-percent increase in other private ownerships. Other private commercial forest land totaled 3,293,600 acres (52 percent of the total in 1968), up from 2,052,000 acres (38 percent of the total in 1952). Publicly owned commercial forest land increased from 297,000 acres in 1952 to 347,700 acres in 1968, but remained at 6 percent of the total commercial forest land.

Forest industries owns 126,800 acres of commercial forest land in Ohio. Most of this, 98,300 acres—2 percent of the total commercial forest land—is owned by the pulp and paper industry. The remaining 28,500 acres are owned by lumber companies and a variety of other wood-using industries. All the forest-industry land is in the Hill Country.

Other private ownerships make up 55 percent—2,404,400 acres—of commercial forest land in the Hill Country and less than 46 percent—889,200 acres—in the Glaciated Region. Publicly owned commercial forest land in the Hill Country totals 303,900 acres, or just under 7 percent of that region's commercial forest land. In the Glaciated Region public ownerships cover slightly more than 2 percent—43,800 acres.

## A High Proportion of Area in Sapling Seedling Stands

Nearly 56 percent of Ohio's commercial forest acreage is covered by sapling-and-seedling stands (fig. 6)[1]. One reason for

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[1] Stand-size class was determined by basal-area stocking in this survey. In the initial survey of Ohio, in 1952, stand-size class was determined by volume per acre. For this reason the stand-size class data presented in this report are not directly comparable with those presented in the report of the 1952 survey. Classification of stand-size by basal area gives a more reliable estimate for timber-management purposes. For a more detailed discussion of stand-size classification see the appendix.
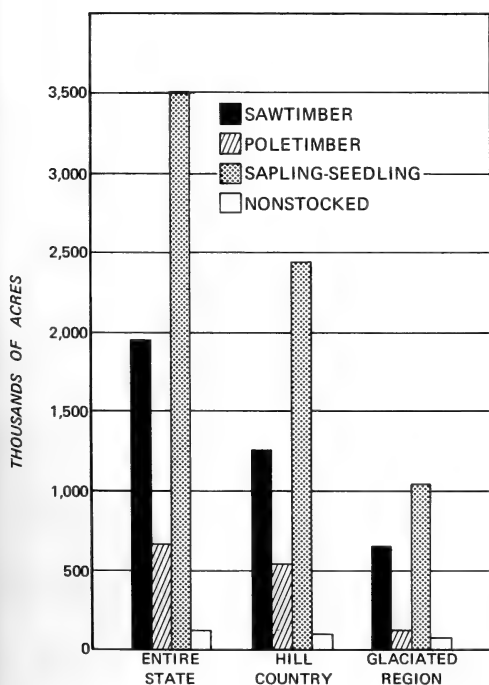


Figure 6. — Sapling and seedling stands cover nearly 56 percent of the commercial forest land in Ohio.

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such a large proportion of area in sapling-and-seedling stands is the substantial increase of over 933 thousand acres in commercial forest land since 1952. Most of this new acreage is classed as nonstocked or sapling-and-seedling stands. Very little of it has had time to develop into poletimber-size stands (fig. 7).

About 31 percent of Ohio's commercial forest land is in sawtimber-size stands. However, this differs between the two major regions of the State. Sawtimber stands cover about 35 percent of the commercial forest land in the Glaciated Region but only 29 percent in the Hill Country. This lower proportion in the Hill Country is the result of more intensive timber cutting in that region.

Another important reason for the large proportion of sapling-and-seedling stands is past timber-harvesting practices. Many stands in Ohio have been high-graded—that is, the best timber was removed, leaving the poorer timber. Or they were cut by the so-called commercial clearcutting method—that is, the area was clearcut but the poorest trees were left untouched. Thus many young stands today are overtopped by low-quality growth, much of it classed as nongrowing-stock trees, which serve to inhibit growth and keep these stands in the sapling-and-seedling classification for a longer than normal period. The magnitude of this problem is discussed later.

Figure 7.—Three typical hardwood stands: sawtimber, poletimber, and sapling and seedling.



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## Area in Larger Volume
## Stands Declines

A comparison of the area of commercial forest land in three stand-volume classes for the two forest surveys (1952 and 1968) shows that the proportion of area in stands containing less than 1,500 board feet covered 2,717,000 acres (50.4 percent of all commercial forest land). In 1968 such stands covered 3,079,900 acres (48.6 percent of the total area in 1968).

Changes have taken place in the other two classes (fig. 8). The area in stands of more than 5,000 board feet per acre fell from 1,581,000 acres (29 percent of the State's commercial forest land) to 928,400 acres (15 percent). The area in stands of 1,500 to 5,000 board feet per acre increased from 1,098,000 acres (20 percent of the area) to 2,320,900 acres (37 percent of the area in 1968).
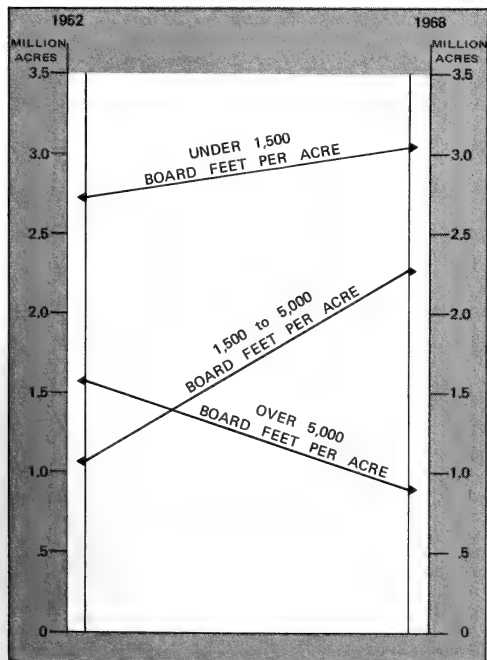


Figure 8.—The area in stands of more than 5,000 board feet per acre dropped considerably while the other two classes increased in area from 1952 to 1968.

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## Hardwood Area up 15 Percent;
## Softwood Area up 141 Percent

Hardwood forest types cover 6,049,700 acres—nearly 96 percent of Ohio's commercial forest land. This is an increase of nearly 770 thousand acres or 15 percent more than the 1952 total of 5,280,000 acres. Softwood types, which cover only 279,500 acres—4 percent of the commercial forest land—showed a 141-percent increase since 1952. In 1952 all softwood types totaled 116,000 acres—only 2 percent of the commercial forest land. This large increase in softwood types is the result of extensive tree planting in the State since 1952.

The most extensive, and economically the most important, major forest type in Ohio is oak-hickory. In 1952 the oak-hickory type covered 3,133,000 acres (58 percent of Ohio's commercial forest land) and in 1968 it covered 2,953,800 acres (47 percent). In the Hill Country the area in oak-hickory failed to keep pace with the general increase in forest land. Though the area of commercial forest land in the Hill Country in 1968 was about 32 percent greater than in 1952, the total area in oak-hickory was unchanged. In the Glaciated Region the decrease in the area of oak-hickory exceeded the decrease in the area of all commercial forest land. Though commercial forest land in 1968 was 7 percent less than in 1952, the area in oak-hickory was 21 percent less.

The second most extensive forest type in Ohio, elm-ash-red maple (or elm-ash-cottonwood) increased in acreage, but declined as a percentage of all forest land. In 1952 this type covered 1,334,000 acres (25 percent of Ohio's commercial forest land) and in 1968 it covered 1,376,000 acres (22 percent). This wet-site type probably has long covered most sites to which it is suited. For this reason any major changes in its extent appear to be unlikely.

Although the two most extensive types declined in area, the other types all increased significantly; so much so, in fact, that these increases offset the decline of the largest types.

The area covered by the maple-beech-birch type in 1968 was 79 percent greater than its area in 1952. In 1952 this type covered 642,000 acres: by 1968 it covered 1,151,600 acres. The increase

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in this type was not limited to either major region of the State. In the Hill Country maple-beech-birch rose from about 271,000 acres in 1952 to 680,900 acres in 1968, a 151 percent increase. In the Glaciated Region it increased from nearly 371,000 acres in 1952 to 470,700 acres in 1968, a gain of 27 percent. This type, which is usually found on deep, fertile, well-drained soils, is potentially a very valuable forest type in Ohio because of the presence of such high-value species as sugar maple, black cherry, and black walnut. However, because past cutting practices have often concentrated on removing the high-value species, many stands of this type contain as much as 70 percent beech. Beech is one of the least valuable species found in Ohio.

The oak-pine type, although it is relatively less important in area covered, increased more than four times between 1952 and 1968. In 1952 this type covered 106,000 acres, but by 1968 it had increased to 478,700 acres. The other hardwood types, which include oak-gum and aspen, covered 65,000 acres in 1952 and now cover 89,600 acres.

# TIMBER VOLUME

## Volume of Growing Stock
## Increased More Than Forest Area

While the total area of Ohio's commercial forest land increased 17 percent from 1952 to 1968, the volume of growing stock gained more than 31 percent. In 1952 Ohio's growing stock totaled 3.2 billion cubic feet; by 1968 the total had risen to nearly 4.2 billion.[2]

Both of the State's major regions gained 31 percent in timber volume. In 1968 the volume of growing stock in the Hill Country totaled 2.9 billion cubic feet, while the volume in the Glaciated Region totaled 1.3 billion cubic feet.

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[2] Because forest-survey methods and definitions changed between 1952 and 1968, direct comparisons of volumes between surveys is not possible. Therefore, the 1952 estimates presented in this report have been adjusted to the 1968 forest-survey standards. A complete discussion of these differences is presented in the appendix.

Figure 9.—The trend of growing stock in Ohio, by tree size class, 1952-68.
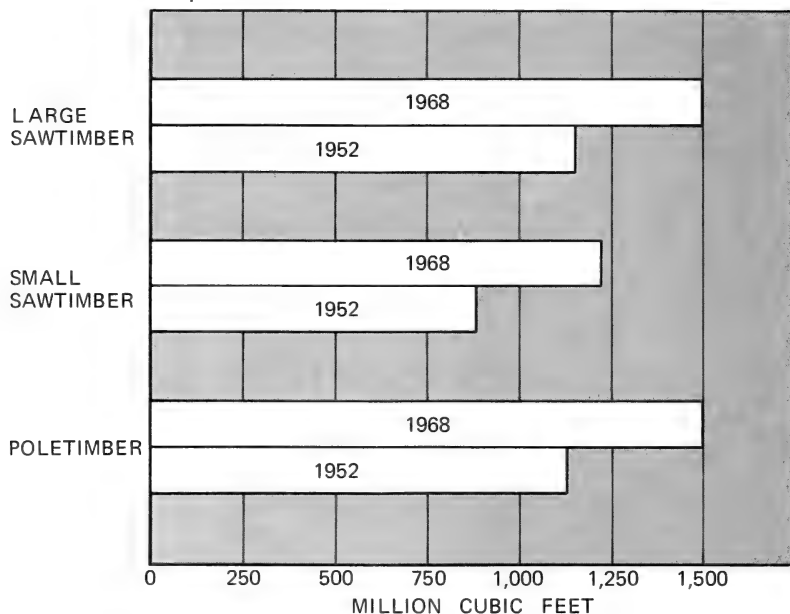
This increase in timber volume caused only minor shifts in the average size of trees in the State (fig. 9). In 1952 and in 1968 about 36 percent of the State's growing-stock volume was in poletimber trees. The percentage in small sawtimber-size trees rose from 27 percent in 1952 to 29 percent in 1968 while the percentage in large sawtimber declined from 37 percent to 35 percent.

In addition to the 4,180,900 cubic feet of growing stock in Ohio's forests, there is 675,300 cubic feet of non-growing stock material. This volume is found in rough and/or rotten trees that are too poor in quality to be classed as growing-stock trees. Much of this material can be used by industries that use timber as a source of wood fiber. More important, this means that of the total of 4,856,200 cubic feet of timber in Ohio's forests, 675,300 cubic feet (14 percent) is in trees that are too poor to be considered growing-stock trees. Figure 10 shows the volume and percentage of all timber in sawtimber, poletimber, rough, and rotten trees.

| | MILLION CUBIC FEET | PERCENT OF ALL TIMBER |
|---|---|---|
| SAWTIMBER TREES | | |
| UPPER STEM | 495.2 | 10.2 |
| SAWLOG PORTION | 2188.4 | 45.1 |
| POLETIMBER TREES | 1497.3 | 30.8 |
| ROUGH TREES | | |
| USABLE VOLUME | 391.6 | 8.1 |
| ROTTEN TREES | | |
| SOUND PORTION | 283.7 | 5.8 |
| ALL TIMBER | 4,856.2 | 100.0 |
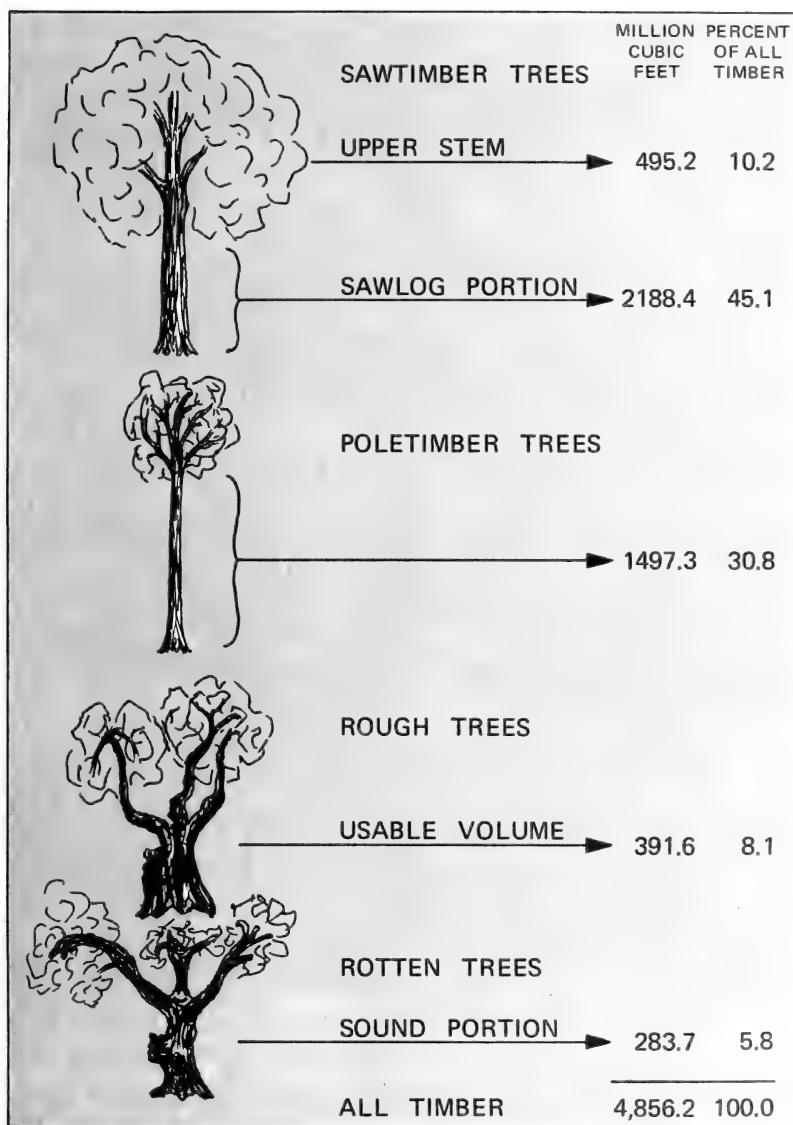
Figure 10.—Distribution of all timber on commercial forest land in Ohio, by kind of material, 1968.

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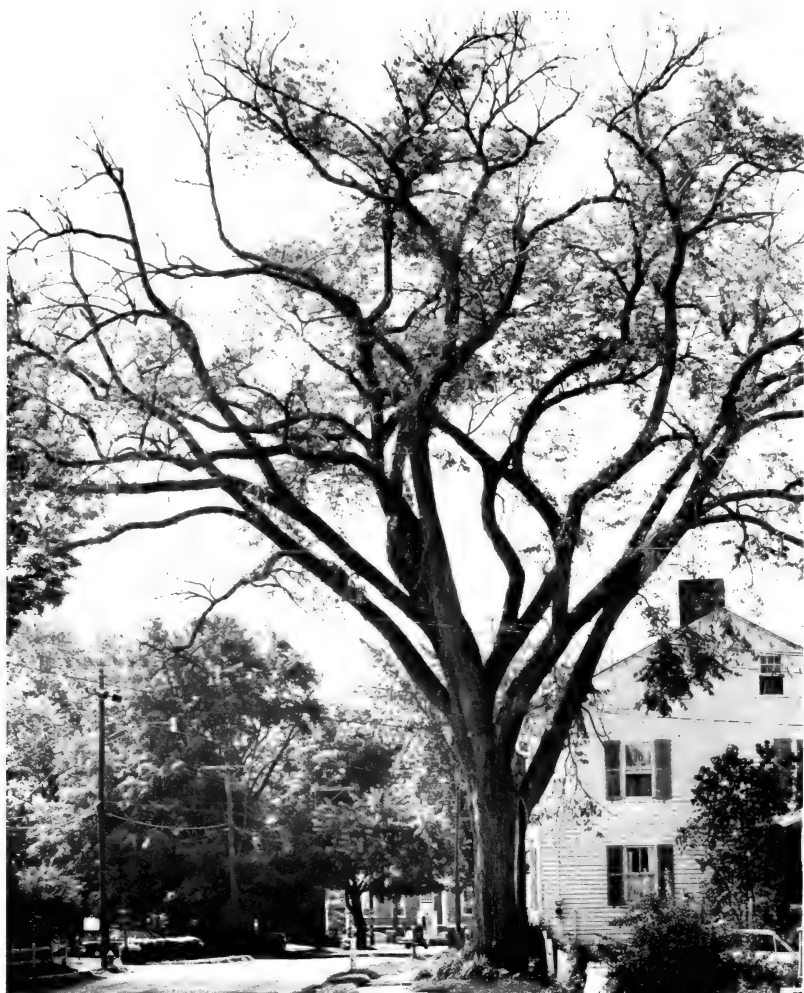
Figure 11.—A once majestic elm succumbs to the Dutch elm disease.

Hardwood species account for slightly more than 97 percent of Ohio's growing stock. The volume is generally well distributed among the various hardwood species common to this region. The oaks are by far the most prevalent species group in Ohio. They account for 1.6 billion cubic feet (39 percent of the hardwood growing stock). Among the oaks, the select white oaks total 593 million cubic feet, select red oaks 313 million, chestnut

oak 252 million, and all other oaks 432 million cubic feet. The second most abundant species group is the hickory group, which accounts for 482 million cubic feet (nearly 12 percent of the hardwood growing stock). Because there is little discrimination among hickory species by industry, no attempt has been made here to show volumes for individual hickory species.

Over the 16-year period the species mix of Ohio's growing stock has been changing. In some cases these changes have been minor and insignificant, but in others they have been major and quite significant. The most notable change was the decline of the elm species (fig. 11). In 1952 the elms accounted for more than 12 percent of the growing stock, but by 1968 they accounted for only 6 percent. Since elm is not a particularly prized timber species, one can only conclude that this decline is almost entirely the result of the Dutch elm disease. The seriousness of this introduced disease needs only to be measured in terms of dead and dying shade trees.

On the plus side, the select white oak species have increased from 11 percent of the inventory to just over 14 percent in 1968. Select red oaks increased from 6 to 7 percent, while the other oak species declined from 18 to 16 percent of the inventory. Hickory increased from 9 to 12 percent. Sugar maple and yellow-poplar increased from 5 to 6 percent, while the ash species and red maple held their own at 6 and 5 percent respectively.

## Sawtimber

Sawtimber volume in the Buckeye State totaled 14.6 billion board feet in 1968, up from 11.2 billion in 1952. This 30-percent increase falls short of the 31-percent increase in all growing-stock volume. The Hill Country contains 9.8 billion board feet (67 percent of the State total). This is an increase of 2.7 billion board feet (38 percent) from the 1952 total of 7.1 billion board feet. The Glaciated Region, which now contains 33 percent of the State's sawtimber—4.8 billion board feet—contained 4.0 billion board feet in 1952. Thus the volume of sawtimber in this region rose about 18 percent during the 16-year interval between forest surveys.

Although the total volume of sawtimber increased, the average diameter of sawtimber trees in Ohio has declined during the 16 years between forest surveys. In 1952, 42 percent of the State's sawtimber volume was in trees 10 to 14 inches in diameter at breast height (d.b.h.). By 1968 this percentage had increased to 44 percent. The volume in 16-to-18-inch trees rose from 27 percent in 1952 to 30 percent in 1968. Thus, even though the volume in sawtimber trees larger than 18 inches increased between surveys, as a percentage of the total sawtimber inventory it fell from 31 percent of the 1952 inventory to 25 percent of the 1968 inventory.

A high percentage of total sawtimber volume in large diameter trees is important for two primary reasons—lumber quality and total lumber volume yield. Usually the larger the tree, the greater the likelihood that the tree will yield high-quality lumber. The sawlog-grading rules used in this survey provide a good illustration of the importance of tree size in relation to lumber quality. These grades use external characteristics of logs as indicators of lumber quality. The log-grade rules for hardwood logs for all practical purposes exclude 12-to-14-inch trees from producing a grade 1 sawlog because a grade 1 log must have a minimum diameter of 13 inches inside bark at the small end. It is highly unlikely that a 14-inch d.b.h. tree could have such a log. Thus 67 percent of Ohio's sawtimber trees almost automatically cannot contain a grade 1 sawlog because of size alone (fig. 12).

It goes without saying that a large tree yields more lumber. But how much more? The International $\frac{1}{4}$-inch log rule table shows that a 12-inch log 16 feet long can be expected to yield 100 board feet of lumber, but a 24-inch 16-foot log (twice the diameter) will yield 420 board feet (4.2 times as much lumber).

Figure 12 further illustrates the relationship between sawtimber volume and the number of sawtimber-size trees by diameter size classes. Note that only 10 percent of the sawtimber size-trees in Ohio contain 25 percent of the State's sawtimber volume. And, as indicated, much of this 25 percent—3.7 billion board feet—is probably of higher than average quality.

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Figure 12.—Large sawtimber trees produce far more lumber than smaller trees.

D.B.H. INCHES

9–15
6.6 BILLION BOARD FEET
68.5 MILLION TREES

15–19
4.3 BILLION BOARD FEET
24.0 MILLION TREES

19+
3.7 BILLION BOARD FEET
10.3 MILLION TREES

PERCENT OF ALL SAWTIMBER VOLUME AND ALL SAWTIMBER-SIZE TREES
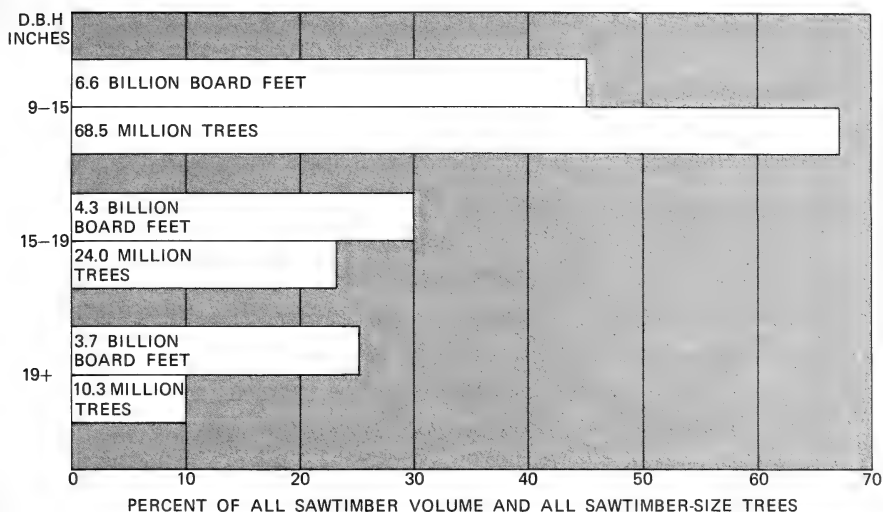
## One-Third of Ohio's Sawtimber is in Upper Log Grades

About one-third of the State's hardwood sawtimber volume is in grade 1 and 2 sawlogs. The distribution of volume by hardwood sawlog grades in 1968 was as follows:

| Grade | Volume (million board feet) | Percent (of total volume) |
|---|---|---|
| 1 | 1,772.4 | 12.5 |
| 2 | 2,973.3 | 20.9 |
| 3 | 6,818.9 | 48.0 |
| 4 | 2,637.5 | 18.6 |

None of the important commercial species in Ohio has as much as 50 percent of its volume in the top two log grades. The select red oak species, the fourth most abundant species in Ohio (588 million board feet) has the highest proportion of its volume in the top two log grades—47 percent. White oak, the most abundant species, has only 36 percent of its volume in the top two log grades. Beech has the lowest proportion in the top two grades: 19 percent. Beech also has the lowest proportion of its volume in grade 1 logs: only 3 percent.

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# NET ANNUAL GROWTH EXCEEDS TIMBER REMOVALS

The average annual net growth of growing stock, based on the remeasurement of permanent sample plots, was 3.2 percent of the growing-stock inventory. This average net annual growth estimate represents an average growth for the 16-year period from 1951 through 1967. The removal of growing stock during the same period averaged 1.7 percent of the inventory volume.

The situation for sawtimber is much like that for growing stock. The average annual net growth of sawtimber was 2.9 percent of the sawtimber inventory. The removal of sawtimber averaged 50 percent of the average annual growth.

So far, we have talked in terms of net annual growth. Net growth is the residual after mortality and the cull increment have been deducted from gross growth. Gross growth is the growth on the initial growing stock-growth on trees that were measured in both the 1952 and 1968 forest surveys—plus ingrowth—the growth of trees that grew into the growing-stock size class between the two surveys. Gross growth of growing stock minus cull increment and mortality equals net growth of growing stock. These are the components of growth. The components of net annual growth for growing stock and sawtimber can be expressed in three ways:

## GROWING-STOCK GROWTH

| Components | Volume (million cubic feet) | Percent of gross growth | Percent of growing-stock inventory |
|---|---|---|---|
| Growth on initial volume | 75.0 | 43 | 1.8 |
| Ingrowth | 99.0 | 57 | 2.4 |
| Gross growth | 174.0 | 100 | 4.2 |
| Annual mortality | 27.0 | 16 | .6 |
| Cull increment | 14.2 | 8 | .3 |
| Average annual growth | 132.8 | 76 | 3.2 |

## SAWTIMBER GROWTH

| Components | Volume (million board feet) | Percent of gross growth | Percent of sawtimber inventory |
|---|---|---|---|
| Growth on initial volume | 200.5 | 35 | 1.4 |
| Ingrowth | 365.2 | 65 | 2.5 |
| Gross growth | 565.7 | 100 | 3.9 |
| Annual mortality | 73.0 | 13 | .5 |
| Cull increment | 70.7 | 12 | .5 |
| Net annual growth | 422.0 | 75 | 2.9 |

It is through manipulation of these components of growth that timber managers seek to increase net growth and improve timber quality.

# TIMBER PRODUCTS OUTPUT

The average annual timber removals shown in this report (tables 20 to 23) were based on the remeasurement of permanent sample plots and should not be confused with the timber-products-output estimates (table 28) and the timber-removal estimate (tables 29 to 31), which are based on a 1966 statewide canvass of forest-products producers.

Timber removals, which include timber cut for products as well as timber removed because of land-use changes like highways and urban development, are based on an average over the period between forest surveys. This gives a reliable description of the growth and removal trend and accurately assesses the changes in the timber inventory since 1952. On the other hand, the timber-removal and timber-products-output estimates for a given year are useful in relating timber removal to the output of timber products. In this section of the report the data obtained from the statewide canvass of timber-products producers are utilized and supplemented with information on timber utilization developed in conjunction with the forest survey and with production data for other years (fig. 13).

In 1952 the total production of timber products in Ohio amounted to 64.5 million cubic feet (fig. 14). By 1966 timber-

Figure 13.—Some scenes of Ohio's forest-products industry.

Bowling pins are one of many turned products.

Hauling out white oak logs with a logging arch.
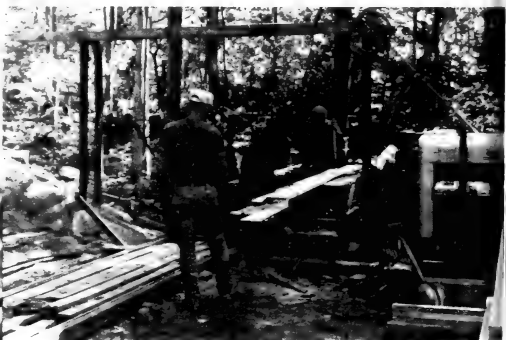
A portable sawmill. Once commonplace, such mills are now seldom seen.

Debarking sawlogs not only provides bark-free slabs that can be chipped for pulpwood, but also increases the life of the headsaw.

Making pallets from lower grade hardwoods.

Black walnut logs await delivery to a veneer mill.

Anthony" Wayne in the Treaty of Green Ville secured southern and central Ohio from the Indian menace.

Ater the Treaty of Green Ville, settlement began in earnest. Settlers swarmed over the mountains and up the river valleys. In 1803, when Ohio was admitted to the Union, the State's population was about 50,000. Seven years later, in 1810, it totaled 230,760. In the following decade, Ohio's population rose 152 percent to 581,434. By 1850 nearly 2 million people lived in Ohio.

When the earliest settlers arrived in Ohio, 95 percent of the land was covered by mature hardwood forests. By 1940 only about 12 percent of Ohio was forested (fig. 1).

The first settlers of Ohio were mostly farmers. The land they found was fertile and well suited to agriculture, but it was covered by dense forests. So it was necessary to clear the land to make way for farming.

The most widespread forest type was the beech-maple type, which extended in a broad band from the northeast to the southwest. Other important types were oak-hickory in the southeast and elm-ash-red maple, which was scattered in wet areas and up stream valleys. It is estimated that some stands contained as much as 45 thousand board feet per acre, but they probably averaged about 12 thousand board feet.

The trees in these forests were generally mature, and very large
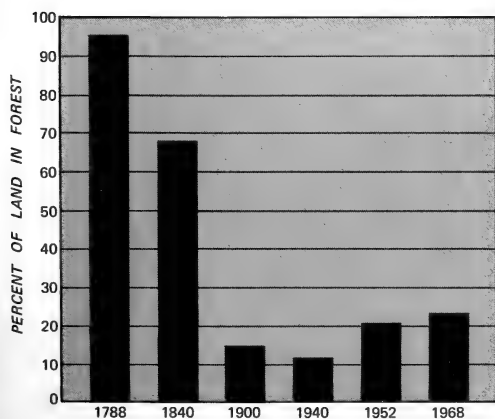


Figure 1. — Forest land area of Ohio as a percentage of all land for selected years 1788 to 1968.

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specimens were probably common. The following account by one Norris Birkbank describes some of these large trees.

> "Yesterday, June 18, 1817, I measured a walnut almost 7 feet in diameter, clean and straight as an arrow. The white oak is the glory of the upland forest. I measured a white oak by the roadside which at 4 feet from the ground was 6 feet in diameter, and at 75 feet it measured 9 feet around. Before we entered on the flat country were some hills (near Chillicothe) covered with the grandest white oak, I suppose, in America. They measured 14 or 15 feet in circumference, their straight stems rising without a branch to 75 or 80 feet — thousands of them."

When we think about the removal of such forests, we may well have a feeling of regret. Yet agriculture was the means of survival to Ohio's early settlers; and these rich and fertile soils helped Ohio to become an agricultural giant among the states in the mid-1800's. So Ohio could not remain densely forested and become an economically healthy and well-developed state—at least not in the world of the nineteenth century.

## Two Distinct Regions

Physiographically, Ohio is divided into two regions: the Hill Country, which covers the southeastern one-third of the State; and the Glaciated Region, which covers the remainder of the State. Throughout this report we will make comparisons and point out contrasts between these two regions (figs. 2 and 3).

Figure 2.—The Hill Country—Scioto County.

Figure 3.—The Glaciated Region—Madison County.

**The Hill Country.**—The Hill Country is that region of the State that was not covered by the glaciers. This is a region of winding rivers, steep hills, and narrow valleys. There are few extensive, well-organized ridges. The eastern portion is part of the Allegheny Plateau, and in a few places it rises above 1,400 feet in elevation. The southern portion is the edge of the Appalachian Plateau and Mountains.

The Hill Country comprises the East-Central, Southeastern, and South-Central Units (fig. 4).

**The Glaciated Region.**—This region covers the remainder of the State. This region had been planed into flat or rolling plains by the movement of glacial ice. The western portion is a rolling plain, which reaches an elevation of 1,550 feet above sea level in Logan County. Northwestern Ohio, also part of the Glaciated Region, is a flat lake plain, which was once the bottom of a body of water much larger than the present Lake Erie.

The Northeastern and the Western Units make up the Glaciated Region.
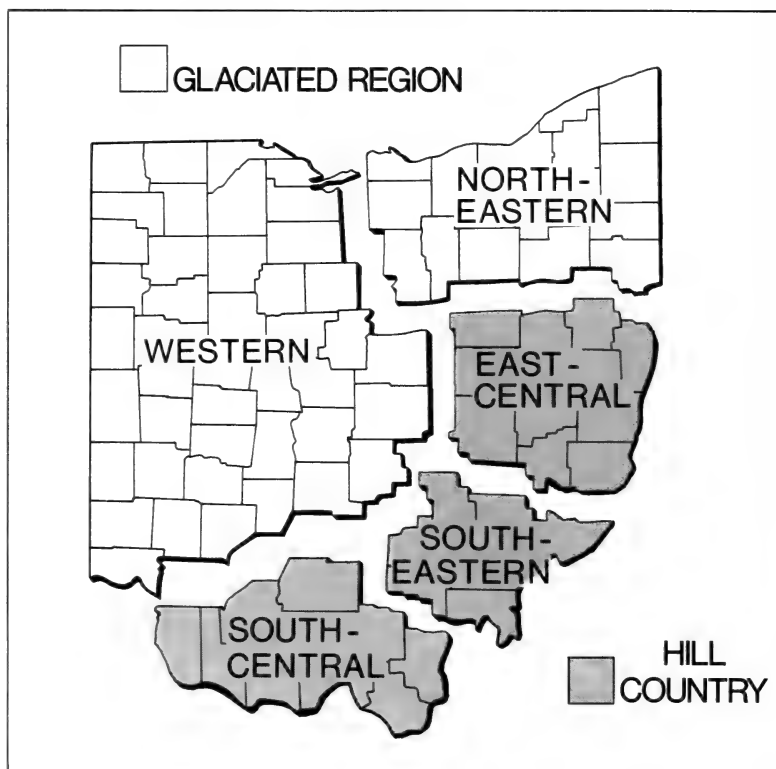
Figure 4.—The forest-survey units of Ohio, 1968.

# FOREST AREA

## Forest Area Up
## 17 Percent Since 1952

The commercial forest land area of Ohio increased 17 percent between 1952 and 1968. In 1968 commercial forest land in Ohio totaled 6,329,200 acres, compared with 5,396,000 in 1952, a gain of 933,200 acres. Commercial forest land now accounts for 24 percent of Ohio's total land area, compared to 21 percent in 1952. Noncommercial forest land increased by 52 percent, but still accounts for less than 1 percent of the total land area of Ohio.

The increase in commercial forest land was not evenly distrib-

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products output had risen to 119.4 million cubic feet. The 1967 estimates, however, show a decline to 109.5 million (fig. 14). Indications are that this downturn was a temporary adjustment and that final production estimates for 1968 will be equal to or even higher than the 1966 estimate.

The estimate of timber-products output for a given year may differ substantially from the timber-removal estimate for the same year. The reasons for this lie in the definitions of the two terms. Timber-products output includes only that material, harvested from both growing stock and nongrowing stock, that was converted into forest products such as sawlogs, veneer logs, round pulpwood, pulpwood chips, and fuelwood. Timber removals, on the other hand, include that portion of timber-products output that came from growing-stock sources, plus any growing-stock material that was destroyed or removed in the process of logging or land-clearing. Thus, if a high proportion of the timber-products output came from nongrowing-stock sources while a low proportion of timber removals was for land-clearing, timber-products output could exceed timber removals. This was apparently the case in Ohio in 1966. In that year the timber removed from growing stock totaled 108.8 million cubic feet while the total timber-products output totaled 119.4 million cubic feet.
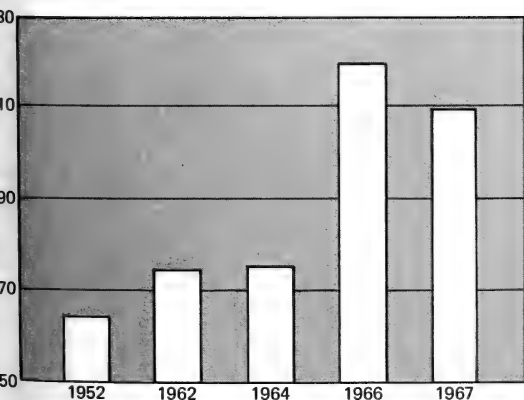


Figure 14.—Timber-products production in Ohio for selected years, 1952-67.

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## Sawlog Production Up
## 171 Million From 1951

In 1900 Ohio produced about 1 billion board feet of lumber. By 1952 the production of lumber in Ohio had declined to 219 million board feet. Fourteen years later production had risen to 390 million board feet (fig. 15).

Also, during this period, as lumber production increased, the number of active sawmills in Ohio actually decreased. In 1952 the estimated number of active sawmills in the State was 1,776, while the average production was only 123 thousand board feet per year. In 1966, however, there were only 411 active mills in the State, and the average output was 948 thousand board feet per year. As might be expected, the Hill Country, which is by far the most forested region of the State, has the largest number of active sawmills—218 compared with 193 in the Glaciated Region. The number of mills in the Hill Country equals 53 percent of the mills in the State, but the Hill Country contains 67 percent of the State's sawtimber.

This apparent disparity is accounted for by looking at the average size of mills in the two regions. The 193 mills in the

Figure 15.—The trend of lumber production in Ohio from 1899 through 1967.
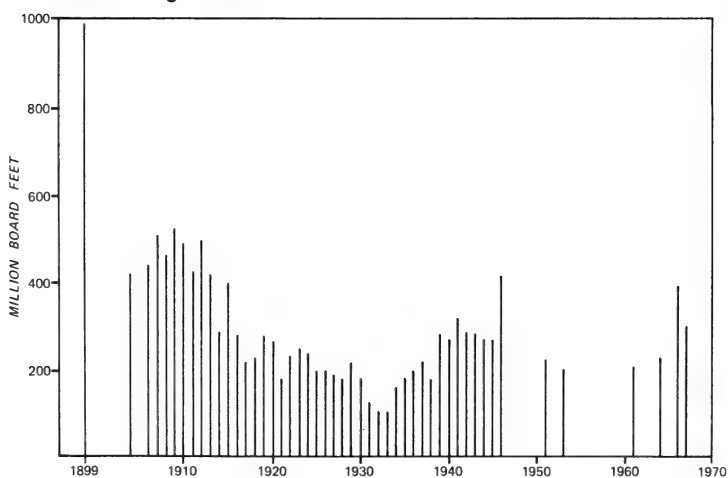
Glaciated Region averaged 843 thousand board feet per year while the 218 mills in the Hill Country averaged nearly 1.0 million board feet per year. Thus, the higher output per mill in the Hill Country brings the total production of the region more nearly into balance with its supply of sawtimber.

The species mix of Ohio's sawtimber production reflects the species mix of its sawtimber resource. Thus lumber production in Ohio runs heavily to the oaks. The following table shows the percentage of total production accounted for by various species and species groups in both 1952 and 1966:

| Species cut | 1952 (percent) | 1966 (percent) |
|---|---|---|
| Oaks | 45 | 43 |
| Maples | 16 | 14 |
| Elms | 12 | 4 |
| Beech | 8 | 5 |
| Yellow-poplar | 6 | 11 |
| All other species | 13 | 23 |

From this tabulation it can be seen that the species cut for sawlogs in Ohio has become somewhat more diversified over the 15-year period between surveys.

## Pulpwood Nearly Twelve Times 1951 Output

Pulpwood production in Ohio has shown extraordinary growth from 1951 to 1966. In 1951, with five woodpulp mills, Ohio produced 32 thousand cords of pulpwood. By 1966 the State had six mills and produced 375.5 thousand cords of wood, nearly 12 times the 1951 production (fig. 16).

The species mix of Ohio pulpwood production also reflects the species mix of the timber resource. In 1966, of the 336.7 thousand cords of round pulpwood produced in Ohio, 54 percent was oak and hickory (mostly oak) and only 3 percent was pine (the only softwood species produced). Other hardwood species accounted for 43 percent. In addition to the 336.7 thousand cords of round pulpwood, the equivalent of 38.8 thousand cords in pulpwood chips were produced, mostly from sawmill slabs and edgings. The use of chipped sawmill slabs and edgings for pulp-
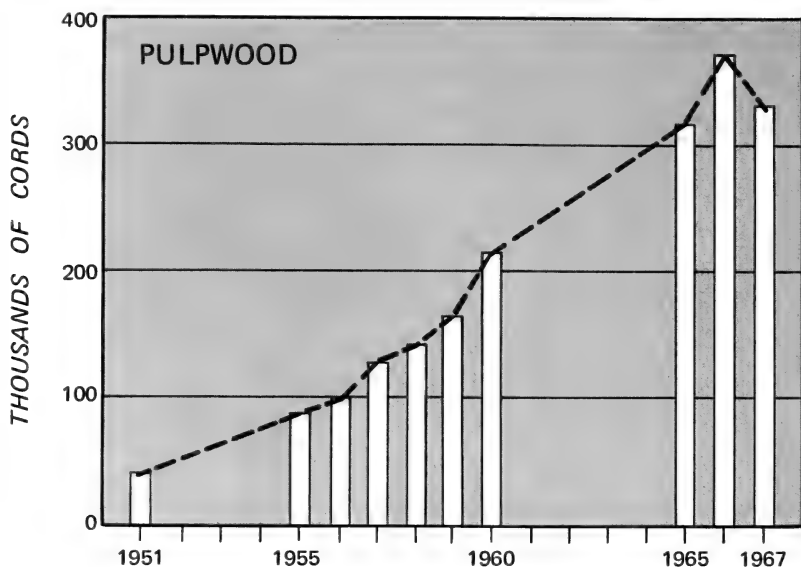
Figure 16.—Since 1951 Ohio's pulpwood industry has shown an outstanding rate of growth.

wood has shown outstanding growth throughout the Nation in recent years and Ohio has been no exception to this trend.

Ohio's six woodpulp mills received 482.8 thousand cords of pulpwood. Thus it was necessary for these mills to import 107,300 cords or 22 percent of their wood from outside Ohio. This additional volume came from West Virginia, Kentucky, Illinois, and Virginia.

Ohio's woodpulp mills had an estimated daily capacity of 1,285 tons of woodpulp in 1966. Three basic pulping processes are used in Ohio: the sulfate process (575 tons per day), the semi-chemical process (500 tons per day), and the asplund process (roofing pulp) (210 tons per day). The list of products manufactured from these pulps is diversified. They include: book papers, business papers, writing papers, corrugating papers, industrial paper products, and building-material products.

## Cooperage Stock at 11 Million

With 12 active cooperage stave mills, Ohio is one of the leading cooperage producing states in the country. In 1966 the State produced 11 million board feet of cooperage stock. Nearly all of this material was white oak for tight cooperage. The wood required by the cooperage industry must be of high quality. Generally, trees 16 inches in diameter at breast height and larger—which will provide straight, knot-free, defect-free bolts—are used to manufacture cooperage staves.

The cooperage industry in Ohio, as in most areas, has been very erratic. Cooperage stock production in Ohio in 1951 amounted to 12.6 million board feet and the State had seven mills. By 1958, production had declined to 8.6 million board feet, but by 1964 it had risen to 16 million board feet. Production turned down again to 11 million board feet in 1966 (fig. 17).

Figure 17.—Cooperage log and bolt production in Ohio has shown an erratic pattern since 1951.



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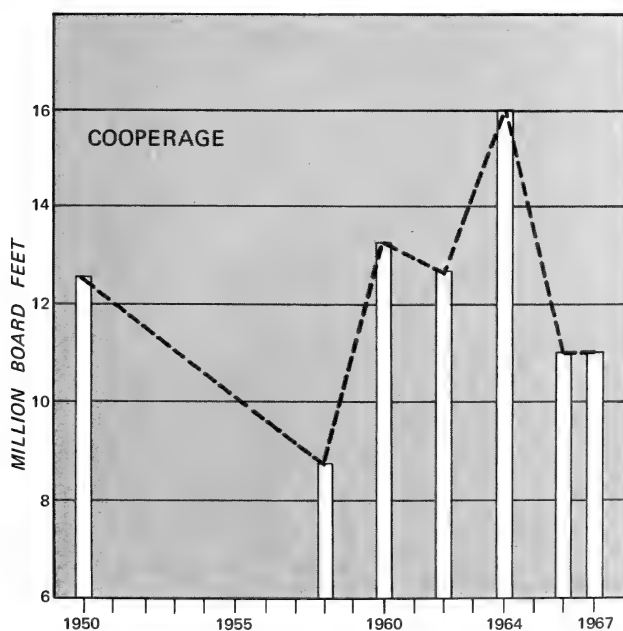
## Veneer Log Harvest—
## 6.7 Million

Ohio produces primarily high-quality veneers for plywood panels and furniture. It also produces lower grade veneers for crating and baskets, but this segment of the industry has been declining for several years. In 1951, in the Central States Region, 40 percent of the veneer production was soft hardwood (yellow-poplar, cottonwood, soft maple) for baskets and containers and the remaining 60 percent was other hardwood species for fine veneers. By 1963 basket and container veneers accounted for about 22 percent of the veneer-stock consumption. Veneer production in Ohio has fallen since 1951, with a brief recovery in 1960 (fig. 18).

In 1966 Ohio's veneer mills consumed nearly 4 million board feet, while in that year 6.7 million board feet were harvested from Ohio's forests. The balance of Ohio's veneer-log harvest is shipped to other states and countries for manufacture. The principal receiving state is Indiana, which processes about one-third of Ohio's production. Thirty-eight percent of the veneer-log production in Ohio in 1966 was black walnut. This species is always in demand for veneer, but Ohio's veneer-log production is well distributed among the prevalent species in the State. In 1966 the production of veneer logs in Ohio by species was:

| Species | Thousand board feet | Percent of total production |
|---|---|---|
| Black walnut | 2,561.6 | 38 |
| Beech | 872.3 | 13 |
| Other hardwoods | 496.0 | 7 |
| Elm | 480.1 | 7 |
| Hard maple | 468.5 | 7 |
| Yellow-poplar | 457.6 | 7 |
| Gum | 314.9 | 5 |
| White oak | 264.0 | 4 |
| Soft maple | 259.4 | 4 |
| Red oak | 231.0 | 4 |
| Hickory | 175.6 | 3 |
| Basswood | 64.7 | 1 |
| Ash | 33.0 | (*) |
| Black cherry | 33.0 | (*) |
| All species | 6,711.7 | 100 |

* Less than 0.5 percent.

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Figure 18.—Veneer log production in Ohio has generally declined since 1951.
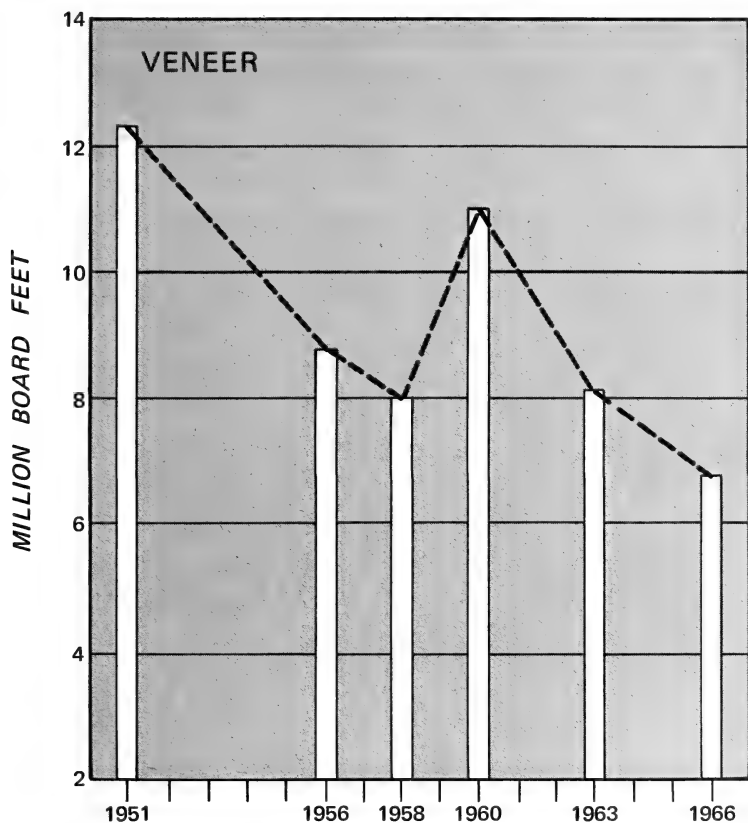
## Other Products

The four main products—sawlogs, pulpwood, cooperage logs and bolts, and veneer logs—accounted for 78 percent of the output of timber products in Ohio in 1966. The remaining 22 percent—26.7 million cubic feet—is made up of a great variety of products. These include fuelwood, mine timbers, fence posts and rails, handle stock, shoe trees, and many other minor products too numerous to mention.

The largest of these other products is fuelwood, which accounted for 174.1 thousand cords or 13.9 million cubic feet in 1966. Of the nearly 14 million cubic feet of fuelwood produced

in Ohio during 1966, nearly 6 million cubic feet was from wood-industry residues like sawmill slabs and edgings. Of the remaining 8 million cubic feet that came from roundwood, only 661 thousand cubic feet were removed from growing stock. Of the remaining 7 million cubic feet, 342 thousand cubic feet came from rough or rotten trees, 2.3 million feet came from dead trees, and nearly 5 million feet came from other sources such as non-commercial forest land, fence rows, shade trees, tree tops and limbs, and from trees less than 5 inches in diameter. Thus, fuelwood constitutes a very minor drain on the growing stock resource.

The second most common of the other products is mine timbers, which in 1966 totaled 1 million cubic feet. Mine timbers are used as props and other timbers primarily to shore up underground mines. They are usually cut from lower quality trees, and all of this material is roundwood. About 80 percent of the mine timber production came from growing stock sources.

The remaining 11.8 million cubic feet of products produced in Ohio in 1966 consisted of poles, posts, and miscellaneous other products. Poles accounted for about 12 thousand cubic feet. Posts—both fence posts and highway guard posts—totaled 866 thousand cubic feet. The remaining volume—10.9 million cubic feet—was distributed among a vast array of minor products including charcoal, handle stock, fence rails, railroad ties, excelsior bolts, turnery bolts, chemical wood, and shoe trees.

# TIMBER SUPPLY OUTLOOK

Projecting future events is at best a difficult and risky business. Projecting the future supply of timber in any area is no exception to this rule. Many unpredictable events such as war, depression, and sudden technological advances can drastically alter any projection. Because of this, all long-range projections must be considered in light of the assumptions under which they are made.

In attempting to project the future timber supply in Ohio, we have settled on two sets of projections, each founded on different basic assumptions. However, underlying both of these projections is the assumption that the future commercial forest land area of Ohio will not increase or decrease appreciably. The reasoning behind this is that future demand for agricultural and urban land, which will be needed to feed and house a growing population, will tend to slow any trend toward an increase of forest land and in fact may reverse the trend by the end of the 30-year projection period. It is expected, however, that the Hill Country will become even more heavily forested in the future while the Glaciated Region becomes less forested. But the combination of an increase in forest land in the Hill Country and a decrease in the Glaciated Region is expected to add up to little or no net change for the State as a whole.

## First Projection: Growth Equals Removals in 1998

The first projection proceeds from the basic assumption that the growth and removal of timber in Ohio will come into balance in 30 years. Growth now totals some 149 million cubic feet, while removals total 109 million. They will come into balance at 292 million cubic feet (fig. 19). The total inventory, under this assumption, is expected to rise from 4,181 million cubic feet in 1968 to 4,786 million cubic feet in 1998.

## Second Projection: Removals Follow 1951-67 Trend

The second projection proceeds from the assumption that timber removal in Ohio will continue along the average trend from 1951 to 1967 during the next 20 years with a slight upswing in the trend during the remaining 10 years. Under this assumption, growth and removal can be expected to rise from their present levels to 359 million cubic feet of growth and 202 million cubic feet of timber removal. The inventory can be expected to rise from 4,181 to 6,793 million cubic feet (fig. 20).

Figure 19.—All growing stock projected growth, removals, and inventory—TRAS projection—1968 to 1998.
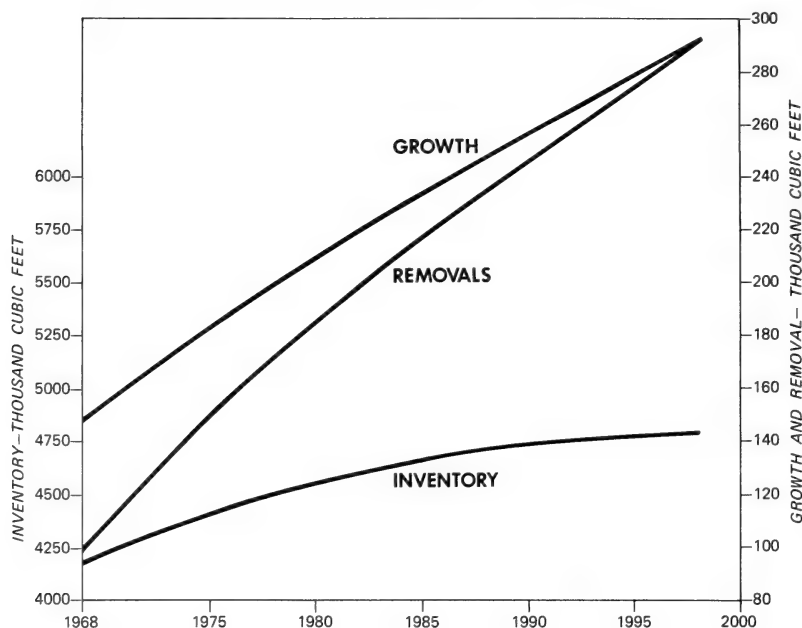


Which of the two projections given here will prevail? Only time will tell. Both projections are well within the realm of possibility. The real trend may be midway between these two projections.

Neither of the preceding projections indicate a critical shortage of growing stock in the future. However, the possibility of shortages of sawtimber seem more likely. This can be seen in the first projection (table 33). While the 1998 growth and removal of all growing stock are in balance, the removal of sawtimber is projected to exceed growth by some 241 million board feet. In fact, a deficit of growth for sawtimber first appears in 1978. Thus users of sawtimber-size material can expect shortages of certain species, log grades, and log sizes to continue and possibly worsen in Ohio. These shortages could be eased and corrected if steps are taken to correct the imbalance of stand-size classes discussed in the timber-management section of this report.

Figure 20.—All growing stock projected growth, removals, and inventory—trend projection—1968 to 1998.
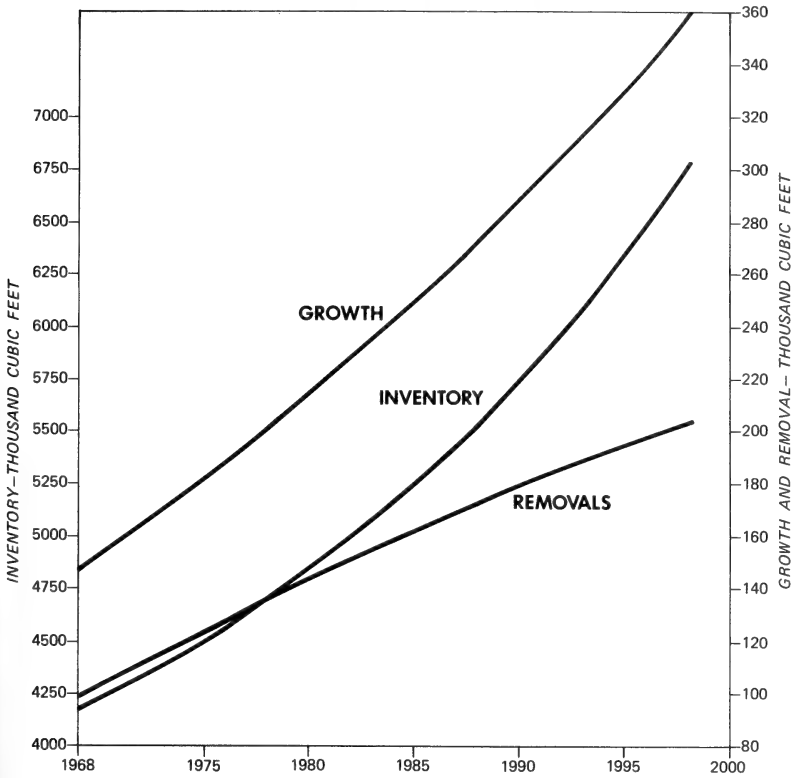


# **MANAGEMENT OPPORTUNITIES**

In viewing the forest resources of Ohio, as the forest survey reveals them, we are concerned about the future management of these resources. So we add this section about management opportunities. This certainly is not intended to be a comprehensive treatise about forest management of these resources. Rather, we want to point out problems that need further attention.

It should be further borne in mind that this section is concerned with the maximum production of timber in the shortest period of time possible. A complete forest-management program over a

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large area must be broad enough to include the forests as a supplier of recreation, wildlife, water, and scenery. In a highly urbanized state such as Ohio, these other uses of the forest often may be very significant.

## Survey Results
## Show a Major Problem

The results of the forest survey point directly to one major problem facing timber-management efforts in Ohio; a large proportion of the commercial forest land area (56 percent) is in sapling-and-seedling stands, and many of these stands have substantial volume in scattered overstory trees. Timber managers seek to achieve about one-third of the area in each stand-size class—sawtimber, poletimber, and sapling-and-seedling.

This disproportionate area in sapling-and-seedling stands has a profound effect on timber growth in Ohio. Per-acre growth in Ohio averages only 21 cubic feet per year, though one should expect it to range between 30 and 40 cubic feet if the stand-size classes were more evenly distributed.

Furthermore, the averge volume of the sapling-and-seedling stands in Ohio is 312 cubic feet per acre. This is substantially more than in neighboring states, such as Pennsylvania, where they average only 153 cubic feet. This indicates that in Ohio there are many sapling-and-seedling stands that are being held back by an overstory composed of scattered larger and often poorer trees.

In an attempt to analyze the condition and possible needs of these sapling-and-seedling stands, we examined a sample of the field tally sheets for those plots that were classed as sapling-and-seedling stands or as nonstocked areas. We attempted to determine what portion of the sapling-and-seedling stands and the nonstocked areas had sufficient volume in the overstory *to*: (1) sustain a harvest cutting for pulpwood or other small log products; (2) sustain a harvest cutting for sawlogs or veneer logs; or (3) make it economically justifiable to girdle and poison the overstory trees.

We further classified the understory stands as: (1) those needing treatment such as thinning, weeding, or planting; and (2)

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those stands that required no treatment. Also, we attempted to estimate the portion of the stands that, because of species composition, stocking or other indications, appear to offer so little promise that no treatment could be economically justified. Though our sample cannot substitute for a thorough stand-by-stand examination, it does give an indication of the extent and magnitude of the treatments needed. The following tabulation summarizes the results of this examination.

| Stand | State | | Hill Country | | Glaciated Region | |
|---|---|---|---|---|---|---|
| | 1,000 acres | Pct. | 1,000 acres | Pct. | 1,000 acres | Pct. |
| Capable of sustaining pulpwood cut[1] | 479.8 | 13 | 358.9 | 14 | 45.1 | 4 |
| Capable of sustaining a sawlog cut[2] | 258.4 | 7 | 205.9 | 8 | — | — |
| Overstory needs to be girdled and poisoned[3] | 1,254.9 | 34 | 922.9 | 36 | 304.4 | 27 |
| Cultural treatment needed in understory | 1,144.2 | 31 | 717.8 | 28 | 405.8 | 36 |
| No cultural treatment needed in understory | 1,476.4 | 40 | 999.8 | 39 | 360.7 | 32 |
| Uneconomic to treat in any way | 1,144.2 | 31 | 743.5 | 29 | 360.7 | 32 |

Data are not additive because any individual stand may be in one or more categories.

[1] 480 cubic feet (6 cords) of growing stock per acre or more in the overstory.

[2] 2,500 board feet or more per acre or 1,000 board feet or more in black walnut or black cherry.

[3] 250 cubic feet in gross volume in the overstory; and diameter of the overstory trees is 10 inches d.b.h. or larger, with an acceptable understory.

The results of this examination clearly indicate that a large-scale timber-stand-improvement program is needed if these stands are to contribute fully to Ohio's timber production. Furthermore, it shows that 3.5 billion cubic feet or more of usable volume exists in these overstories. Thus it may be possible to both release many overtopped young stands and to supply a substantial portion of Ohio's timber demand at the same time.

## Two Timber Types Produce
## Most of State's Timber Products

Ohio contains two major forest types: the oak-hickory type (often called upland hardwoods), which covers 2,953,800 acres; and the maple-beech-birch type (often called the northern hard-

woods), which covers 1,151,600 acres. Together these two forest types account for 65 percent of Ohio's commercial forest land. These are the types that produce the lion's share of Ohio's timber products. Since the upland hardwoods and the northern hardwoods are two very different timber types, the management of each type is also very different. The suggested course of management for each type is discussed separately.

## Management of the Upland Hardwoods

In Ohio the oak types occur on generally poorer sites and produce slightly less volume per acre than the northern hardwoods. Commercially, the oaks are the more important of the two types because they cover three times as much total area as the northern hardwoods and because they generally occur in larger tracts, especially in the hilly, unglaciated portion of the State where soil and topography are poorly suited to agriculture.

Seldom are the funds or labor available to apply intensive management to all stands in an area. For this reason timber production should be concentrated on those sites that will yield the highest return on invested funds and labor.

Considerable research has been undertaken to determine the most suitable management system for upland hardwoods. The results of this research show that the most successful system of management in the oak types is one that includes frequent thinnings with regeneration of stands by clearcutting at the end of the rotation (fig. 21).

Early and frequent thinnings in upland hardwoods can shorten sawlog rotations as much as 40 percent. Thus stands that under little or no management would require 90 to 100 years to produce mature sawlog-size trees could, under constant management (which would include frequent thinnings) produce sawlog-size trees in 55 to 60 years. Several guidelines can be listed for managing the upland hardwoods for timber production:

1. Decide on the area that will be managed as a unit to the end of the rotation.

Figure 21.—A recently clearcut upland hardwood stand. While temporarily unattractive, such areas quickly become young stands and also provide excellent habitat for many wildlife species.

2. Depending on site quality and products desired, determine the average size of trees desired at the end of the rotation.
3. Select the potential crop trees and keep them free to grow throughout the rotation by means of frequent thinnings, 8 to 15 years apart, up to a stand age of 50 to 60 years.
4. Adjust the intensity of cultural work to the quality of the site; concentrate the most work on the better sites.
5. Do not thin below minimum full utilization of the site—usually 55 to 60 percent of normal stocking.
6. At the end of the rotation, regenerate the stand by clear-cutting.

Because of the already short rotation, it is not possible to shorten pulpwood rotations by frequent thinnings. However, frequent thinning will greatly increase the total yield from pulpwood stands over the full rotation. At this time, however, high carrying costs of land, and the high degree of mechanization in pulpwood harvesting, may often make it impossible to conduct profitable thinnings in stands that are being managed exclusively for pulpwood. Ironically, the development of profitable thinning techniques in pulpwood production may be spurred by even higher carrying costs for land and the development of less expensive and more mobile equipment. Thus it may become necessary to cover part of these high carrying costs of land by increasing the total yield of pulpwood over the rotation, which can be accomplished only through the use of regular thinning.

Clearcutting appears to be the best method for regenerating stands in the upland hardwoods for several important reasons. First, clearcutting favors the establishment of the intolerant, and generally most valuable species. Second, the upland hardwood species grow most rapidly in full sunlight. And finally, most of the present sawtimber stands in the Hill Country resulted from heavy cutting 80 to 100 years ago.

Because this past cutting all took place over a relatively short period of time, many of today's sawtimber stands are at about the same stage of development. Thus the region now has a seriously unbalanced distribution of age classes. Carefully arranged, clearcutting, over a period of time, can serve to correct this imbalance and bring about a better distribution of stand-age classes and more uniform timber yields.

If the present stands are harvested only when they are mature, the present unbalanced pattern of stand-age classes in the region will be perpetuated. This could have a very serious effect on the region's economy because stable, modern, large-scale wood-using industries require a steady flow of timber. Smaller, less stable firms would move into the region to exploit the abundance of timber. But they would move out of the region or go out of business once this abundant timber had been consumed. Such a cut-out and get-out pattern would tend to perpetuate a cyclic

regional economy and would discourage those firms that could provide steady and large-scale employment from locating in the region.

Clearcutting means removing not only all merchantable stems, but also removing or poisoning all smaller stems down to about the 2-inch diameter class. It is also important in clearcutting to remove all rough or rotten trees and all trees that appear to be potential rough or rotten trees.

Seed trees are not necessary for reproduction of upland hardwood stands. Research has shown that yellow-poplar seed remains viable for at least 4 years, ash seed remains viable at least 2 years, and there is circumstantial evidence that cherry seed remains viable for several years too. Oaks, in the new stand, regenerate from previously established seedling sprouts and stump sprouts. Bey showed that 27 years after clearcutting in a fully stocked central hardwood stand, most of the oak reproduction had root systems that were 3 to 37 years older than the stems.

## Management of the Northern Hardwoods

The northern hardwoods are the predominant species in most of the Glaciated Region of Ohio. Much of the forest land in this region (52 percent) is owned by farmers; and much of it is in relatively small tracts. The most realistic management objective for timber production in this region and type would appear to be to concentrate on producing high-value species and high-quality logs. Such high-value species include sugar maple, ash, and white oak, and in some areas black cherry and black walnut.

The northern hardwoods allow a wider range of silvicultural options than do the oak types. These options range from single-tree selection through group selection to a full-scale even-aged system such as previously described for the upland oaks. Because there are few extensive tracts of northern hardwood in Ohio, the single-tree selection and group-selection systems will probably be best suited to the objectives of most of the region's forest landowners.

The use of single-tree selection cutting will increase the proportion of sugar maple in a stand. The single-tree selection system also perpetuates a continuous forest canopy, provides maximum site protection, and, when it is properly applied, produces large high-value products in individual trees.

The use of the group-selection system will increase the proportion of the less tolerant species in the stand. In fact, deliberate openings must be created to reproduce the highly intolerant and valuable species such as black cherry and black walnut.

The use of small clearcuttings has been used sucessfully to regenerate northern hardwoods. In those northern hardwood stands in Ohio that contain large numbers of yellow-poplar, red oak, black cherry, or black walnut, or where management is aimed toward production of these species, the use of a clearcutting system should be given consideration.

## Forest Land Ownership

Ninety-two percent of Ohio's commercial forest land is owned by farmers or by a variety of private owners—school teachers, businessmen, and the like. These people generally own relatively small holdings for almost as many reasons as there are owners. They may own forest land for hunting, land speculation, aesthetics, or simply because "it came with the place." Whatever an individual's reasons may be, research indicates that practicing forestry for timber production is not likely to be his reason, particularly if the owner has a small holding.

The theoretical potential of private forest land for timber production nearly staggers the imagination. Therefore one of the major problems faced by those public and private agencies concerned with forest management is: "How can we interest the private forest landowner in practicing forestry?" Ways should be investigated to encourage the practice of forestry among private woodland owners. When this can be accomplished, Ohio will be a big step closer to realizing the full potential of its forest land.

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■

# APPENDIX

## DEFINITIONS OF TERMS

### Land Area Classes

**Land area.**—(a) *Bureau of the Census.* The area of dry land and also land that is temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals that are less than $\frac{1}{8}$ statute mile in width; and lakes, reservoirs, and ponds that are less than 40 acres in area. (b) *Forest Survey.* The same as the Bureau of the Census, except that the minimum width of streams, etc., is 120 feet, and the minimum size of lakes, etc., is 1 acre.

**Forest land.**—Land that is at least 10 percent stocked (contains at least 7.5 square feet of basal area) by forest trees of any size, or that formerly had such tree cover, and is not currently developed for non-forest use. (Forest trees are woody plants that have a well-developed stem and usually are more than 12 feet in height at maturity.)

**Commercial forest land.**—Forest land that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization. (*Industrial wood:* all roundwood products, except fuelwood.)

**Noncommercial forest land.**—Forest land that is incapable of yielding timber crops because of adverse site conditions (unproductive forest land), and productive forest land that is withdrawn from commercial timber use through statute or administrative regulations (productive-reserved forest land).

**Productive-Reserved Forest Land.**—Forest land that is sufficiently productive to qualify as commercial forest land, but is withdrawn from timber utilization through statute or administrative designation.

**Unproductive Forest Land.**—Forest land that is incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

**Nonforest Land.**—Land that has never supported forests; and land formerly forested but now in nonforest use such as crops, pasture, urban areas, and the like.

### Ownership Classes

**National Forest.**—Federal lands that have been legally designated as National Forests or purchase units, and other lands that are under the administration of the Forest Service.

**Other Federal.**—Federal lands other than national forests that are administered by other Federal agencies.

**State.**—Lands that are owned by the State of Ohio or leased to the State for 50 years or more.

**County and municipal.**—Lands that are owned by counties and local public agencies or municipalities or leased to them for 50 years or more.

**Forest industry.**—Lands that are owned by companies or individuals operating wood-using plants.

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**Farmer-owned.**—Lands that are owned by farm operators. Excludes land leased by farm operators from nonfarm owners.

**Miscellaneous private.** — Privately owned lands other than forest-industry and farmer-owned lands.

### Stand-Size Classes

**Stand.**—A growth of trees on a minimum of 1 acre of forest land that is at least 16.7 percent stocked by forest trees of any size.

**Sawtimber stands.**—Stands that are at least 16.7 percent stocked with growing-stock trees (see definitions under *Tree Classes*), with half or more of total stocking in sawtimber or poletimber trees, and with saw-timber stocking at least equal to poletimber stocking.

**Poletimber stands.**—Stands that are at least 16.7 percent stocked with growing-stock trees, of which half or more of this stocking is in pole-timber and/or sawtimber trees and with poletimber stocking exceeding that of sawtimber.

**Sapling-seedling stands.**—Stands that are at least 16.7 percent stocked with growing-stock trees, of which more than half of the stocking is saplings and/or seedlings.

**Nonstocked areas.**—Commercial forest land that is less than 16.7 percent stocked with growing-stock trees.

### Stocking Classes

**Stocking.** — The degree of occupancy of land by trees, measured in terms of basal area and/or number of trees in a stand compared to the basal area and/or number of trees required to utilize fully the growth potential of the land. The actual stocking at a point was evaluated against a standard of 75 square feet of basal area per acre. The stocking per-centage for a sample plot is derived from the stocking for each of 10 points. Three categories of stocking are used:

**All live trees.**—These are used in the classification of forest land and forest types.

**Growing-stock trees.**—These are used in the classification of stand-size classes.

**Desirable trees.**—These are used in the classification of area-condition classes.

The degree of plot stocking is viewed as a range of values rather than single points. A fully stocked stand lies within the range of 100 to 133 percent of the basal-area standard. An overstocked stand contains more than 133 percent. The range for medium stocking is 60 to 100 percent and for poor stocking is 16.7 to 60 percent of the basal-area standard. Forest land with less than 16.7 percent of the basal-area standard is classed as nonstocked.

### Tree Classes

**Growing-stock trees.**—Live trees of commercial species that are classified as sawtimber, poletimber, saplings, and seedlings; that is, all live trees of commercial species except rough or rotten trees. (See definitions under *Class of Timber.*)

**Acceptable trees.**—Growing-stock trees of commercial species that meet specified standards of size and quality, but do not qualify as desirable trees.

**Desirable trees.**—Growing-stock trees of commercial species: (a) that have no serious defects in quality that limits present or prospective use for timber products, (b) that are of relatively high vigor, and (c) that contain no pathogens that may result in death or serious deterioration before rotation age.

**Rotten trees.**—Live trees of commercial species that do not contain at least one 12-foot sawlog or two noncontiguous sawlogs, each 8 feet or longer, now or prospectively, and do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

**Rough trees.**—(1) The same as above, except that rough trees do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (2) all live trees that are of noncommercial species.

## Site Quality Classes

**Site class.**—A classification of forest land in terms of inherent capacity to grow crops of industrial wood. Classifications are based upon the mean annual growth of growing stock attainable in fully stocked stands at culmination of mean annual growth.

## Forest Types

The forest-type classification of each sample plot is based upon the species that make up a plurality of live tree stocking. The many local forest types were combined into the following major forest types.

**White pine-red pine-hemlock.**—Forests in which eastern white pine, red pine, or hemlock, singly or in combination, make up a plurality of the stocking. (Common associates include aspen, birch, and maple.)

**Virginia-pitch pine.**—Forests in which Virginia pine, pitch pine, or other southern yellow pines, singly or in combination, make up a plurality of the stocking. (Common associates include oak, hickory, and gum.)

**Oak-pine.**—Forests in which hardwoods (usually upland oaks) make up a plurality of the stocking, but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar).

**Oak-hickory.**—Forests in which upland oaks or hickory, singly or in combination, make up a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

**Oak-gum.**—Bottomland forests in which blackgum, sweetgum, or oaks, singly or in combination, make up a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stands would be classified oak-pine. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

**Elm-ash-red maple.**—Forests in which elm, ash, or red maple singly or in combination, make up a plurality of the stocking. (Common associates include willow, sycamore, beech, and cottonwood.)

**Maple-beech-birch.**—Forests in which sugar maple, beech or yellow birch, singly or in combination, make up a plurality of the stocking. (Common associates include hemlock, elm, basswood, and white pine.)

**Aspen-birch.**—Forests in which aspen, paper birch, or gray birch, singly or in combination, make up a plurality of the stocking. (Common associate is maple.)

### Class of Timber

**Softwoods.** — Coniferous trees that are usually evergreen, having needles or scalelike leaves.

**Hardwoods.**—Dicotyledonous trees that are usually broad-leaved and deciduous.

**Sawtimber trees.**—Live trees of commercial species: (a) that are of the following minimum diameters at breast height—softwoods 9.0 inches and hardwoods 11.0 inches, and (b) that contain at least one 12-foot merchantable sawlog and meet regional specifications for freedom from defect.

**Poletimber trees.**—Live trees of commercial species that meet regional specifications of soundness and form, and are at least 5.0 inches in d.b.h., but are smaller than sawtimber size.

**Saplings.**—Live trees of commercial species that are 1.0 to 5.0 inches in diameter at breast height and of good form and vigor.

**Seedlings.**—Live trees of commercial species that are less than 1.0 inch in diameter at breast height that are expected to survive.

**Rough and rotten trees.**—See definitions under *Tree Classes*.

### Select Species

**Select Oaks.**—The following oak species are considered select because they are the preferred oak species for lumber.
**Select white oaks:**
 White oaks—*Quercus alba*
 Swamp chestnut oak—*Q. michauxii*
 Chinkapin oak.—*Q. muehlenbergii*
 Durand oak—*Q. durandii*
 Swamp white oak—*Q. bicolor*
 Bur oak.—*Q. macrocarpa*
**Select red oaks:**
 Northern red oak—*Q. rubra*
 Cherrybark oak—*Q. falcata var. pagodaefolia*
 Shumard oak.—*Q. shumardii*

### Timber Volume

**Growing-stock volume.**—Net volume, in cubic feet, of live growing-stock trees that are 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0 inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. Net volume equals gross volume less deduction for rot.

**Standard cord.**—A unit of measure for stacked bolts of wood, encompassing 128 cubic feet of wood, bark, and air space. Cord estimates can be derived from cubic-foot estimates by applying an average factor of 80 cubic feet of wood (inside bark) per rough cord.

**Sawtimber volume.**—Net volume in board feet, International ¼-inch rule, of merchantable sawlogs in live sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

**Sawlog.**—A log that meets minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods. (See specifications under *Log Grade Classification.*)

**Sawlog portion.**—That part of the bole of a sawtimber tree between the stump and the sawlog top (merchantable height).

**Sawlog top.**—The point on the bole of a sawtimber tree above which a sawlog cannot be produced. The minimum sawlog top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

## Log Grade

Log grades are a classification of logs based on external characteristics as indicators of quality or value. The log-grade standards and grading systems used in this forest survey of Ohio are outlined below.

# HARDWOOD FACTORY LUMBER LOG GRADES

(From USDA Forest Products Laboratory Report D 1737)

### SPECIFICATIONS

| GRADE FACTORS* | Log grade 1 | | | Log grade 2 | | | Log grade 3 |
|---|---|---|---|---|---|---|---|
| | Butts only | Butts & uppers | | Butts & uppers | | | Butts & uppers |
| Position in tree | | | | | | | |
| Minimum diameter (inches) | 13-15¹ | 16-19 | 20+ | 11² | | | 8+ |
| Minimum length (feet) | 10+ | 10+ | 10+ | 8-9 | 10-11 | 12+ | 8+ |
| Clear cuttings** on each of the 3 best faces — Min. length (ft.) | 7 | 5 | 3 | 3 | 3 | 3 | 2 |
| Clear cuttings — Max. number | 2 | 2 | 2 | 2 | 2 | 3 | — |
| Clear cuttings — Min. yield in face length | 5/6 | 5/6 | 5/6 | 3/4 | 2/3 | 2/3 | 1/2 |
| Max. sweep and crook allowance (percent of gross volume) See page 69 for scale deductions | 15 | | | 30 | | | 50 |
| Max. cull and sweep allowance (percent of gross volume) | 40³ | | | 50⁴ | | | 50 |

\* End defects, although not visible in standing trees, are important in grading cut logs. Instructions for dealing with this factor are contained in Forest Products Lab. Rpt. No. D 1737.

\*\* A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth the surface of the log as divided lengthwise.

[1] Ash and basswood butts can be 12 inches if otherwise meeting requirements for small No. 1's.

[2] 10-inch logs of all species can be No. 2 if otherwise meeting requirements for small No. 1's.

[3] Otherwise No. 1 logs with 41-50 percent cull can be No. 2.

[4] Otherwise No. 2 logs with 51-60 percent cull can be No. 3.

Source: A Guide to Hardwood Log Grading, p. 11, NE. Forest Exp. Sta., Upper Darby, Pa. 1963.

# HARDWOOD CONSTRUCTION LOG SPECIFICATIONS

(Grade 4)

| GRADE FACTORS | | SPECIFICATIONS |
|---|---|---|
| Position in tree | | Butts and uppers |
| Scaling diameter (inches) | | 8+ |
| Length, without trim (feet) | | 8+ |
| Clear cuttings | | No requirements: not graded on cutting basis. |
| Max. sweep allowance | | One-fourth d.i.b. of small end for half logs, and one-half d.i.b. for logs 16 feet long. |
| Sound surface defects permitted | Single knots | Any number, if none has an average collar* diameter that is more than one-third of log diameter at point of occurrence. |
| | Whorled knots | Any number, provided the sum of the collar diameters does not exceed one-third the log diameter at point of occurrence. |
| | Holes | Any number not exceeding knot specifications if they do not extend more than 3 inches into the contained tie or timber. |
| Unsound surface defects permitted** | | Any number and size if they do not extend into contained tie or timber. If they extend into contained tie or timber, they shall not exceed size, number, and depth of limits for sound defects. |

*Knot collar is the average of the vertical and horizontal diameters of the limb or knot swelling as measured flush with the surface of the log.

**Interior defects are not visible in standing trees. They are considered in grading cut logs. No interior defects are permitted except one shake not more than one-third the width of the contained tie or timber, and one split not more than 5 inches long.

Source: A Guide to Hardwood Log Grading, p. 28, NE. Forest Exp. Sta., Upper Darby, Pa. 1963.

# METHODS OF DETERMINING SCALING DEDUCTION

*(Examples based on an 8-foot log with 20-inch scaling diameter)*
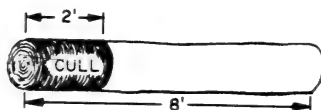


If <u>section</u> of bole is affected, deduct percent of log length affected.

Example: $\dfrac{2}{8} = 25$ percent cull
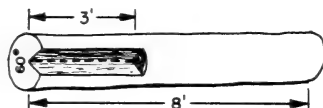


If <u>sector</u> is affected, multiply percent of circle times percent of length.

Example: $\dfrac{60°}{360°} \times \dfrac{3}{8} = 6$ percent cull
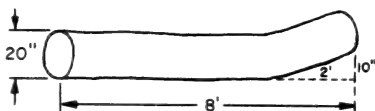


For a <u>crook</u>, multiply proportion of diameter displaced times proportion of $\overline{\text{log}}$ length affected by crook.*

Example: $\dfrac{10}{20} \times \dfrac{2}{8} = 12$ percent board-foot cull
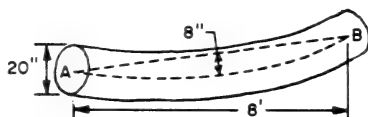


For a <u>sweep</u>, determine sweep departure and subtract 1 inch for 8-foot logs or $\overline{2}$ inches for 16-foot logs. Divide by log diameter.

Example: $\dfrac{8 \text{ - } 1}{20} = 35$ percent board-foot cull**
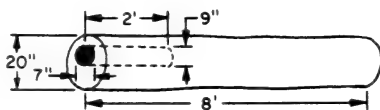


For <u>interior cull</u>, square out interior cull as a percent of total volume of the section. For board-foot cull, add 1 inch to width and to thickness; for cubic-foot cull, use actual dimensions of rot. For board-foot cull divide width and thickness by the scaling diameter (average d.i.b., small end) minus 1; for cubic-foot cull, divide by scaling diameter. Multiply fractions by percent of log affected.

Example: $\dfrac{8 \times 10}{20 \text{-} 1} \times \dfrac{2}{8} = 6$ percent cubic-foot cull.

* No reduction of cubic-foot volume will be made.
** If a straight line between A and B falls outside the bark, the affected section is over 50 percent cull in board feet.

# WHITE PINE LOG GRADES

Unpublished Trial Specifications, 1963

| Log grade | Minimum size | | Defect allowance | | Maximum weevil injury | Allowable knot size (inches) on 3 best faces or minimum clearness on 4 faces |
|---|---|---|---|---|---|---|
| | Diameter | Length[1] | Sweep or crook | Total cull including sweep | | |
| | *Inches* | *Feet* | *Percent* | *Percent* | *Number* | *Inches* |
| No. 1 | 12 & 13 | 8-16 | 20 | 50 | 0 | 4 faces free of knots $\frac{1}{2}''$ or larger full length of log. |
| | 14+ | 10-16 | 20 | 50 | 0 | 2 faces free of knots $\frac{1}{2}''$ or larger full length of log, or 4 faces free of knots $\frac{1}{2}''$ or larger 50 percent length of log (6' minimum length), or[2] |
| No. 2 | 6+ | 8-16 | 30 | 50 | 0 | Sound red knots $\leqq$[3] D6/ and no larger than 3". Black knots: Butt logs $\leqq$ D/12 and no larger than $1\frac{1}{2}''$. Upper logs $\leqq$ D/10 and no larger than $1\frac{1}{2}''$. or 4 faces free of knots $\frac{1}{2}''$ or larger 50 percent length of log. |
| No. 3 | 6+ | 8-16 | 40 | 50 | 8' logs: 1 weevil / 10' + logs: 2 weevil | Sound red knots $\leqq$ D/3 and no larger than 5". Black dots $\leqq$ D/6 and no larger than $2\frac{1}{2}''$. |
| No. 4 | 6+ | 8-16 | 50 | 50 | No Limit | No Limit |

[1] Plus trim.

[2] If the sum of the diameters of sound red knots plus 2X (sum of the diameters of dead or black knots) in inches is $\leqq$ $\frac{1}{2}$ the diameter of the log (in inches).

[3] $\leqq$ means equal to or less than.

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# SOUTHERN PINE LOG GRADES

| Grade factor | Grade | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Minimum | 17" | 10" | 6" | 6" |
| Maximum K value | 1/5D | 1/2D | None | None |
| Minimum specification on bad knots | | | Any bad knots present are localized in section not exceeding $1/4$ circumference and length | No limit |

Exceptions

a. Lower one grade any log, not grade 4, having 3 inches or more of sweep if such sweep is $1/3$ or more of log diameter.

b. Lower one grade any log, not grade 4, if heart-rot fruiting has occurred or is imminent, as indicated by conk or visible, massed, heart-rot hyphae.

K = Number of overgrown knots plus sum of diameters of sound knots plus twice sum of diameters of unsound knots.

Bad knot: A knot with diameter $>$ D/6, or an unsound knot (advance decay or a hole $> 1/4$" and 2" or more deep).

**Average net annual growth of growing stock.**—The change (resulting from natural causes) in volume of sound wood in sawtimber and pole-timber trees during the period between surveys, divided by the length of the period. (Components of net annual growth of growing stock include the increment in net volume of trees present at the beginning of the period and surviving to its end, plus net volume of trees, reaching poletimber size during the period, minus the net volume of trees that died during the period minus the net volume of trees that became rough or rotten trees during the period.)

**Ingrowth of growing stock.**—The net cubic-foot volume of trees now classed as growing stock that were not tallied as such on the initial survey, divided by the length of the period between surveys.

**Average annual mortality of growing stock.**—The net cubic-foot volume removed from the growing stock through death from natural causes during the period between surveys, divided by the length of the period.

**Average annual growing-stock removals.**—The net cubic-foot volume of live growing-stock trees harvested or killed in logging, cultural operations such as timber-stand improvement, land-clearing, or changes in land use during the period between surveys and converted to an annual basis.

**Average net annual growth of sawtimber.**—The change (resulting from natural causes) in net board-foot volume of sawtimber during the period between surveys, divided by the length of the period. (Components of net annual growth of sawtimber include the increment in net volume of sawtimber trees present at the beginning of the period and surviving to its end, plus the net volume of trees reaching sawtimber size during the period, minus the net volume of sawtimber trees that died during the period, minus the net volume of sawtimber trees that became rough or rotten during the period.)

**Ingrowth of sawtimber.**—The net board-foot volume of trees now classed as sawtimber that were not tallied as such on the initial survey, divided by the length of the period between surveys.

**Average annual mortality of sawtimber.**—The net board-foot volume removed from live sawtimber through death from natural causes during the period between surveys, divided by the length of the period.

**Average annual sawtimber removals.**—The net board-foot volume of live sawtimber trees harvested or killed in logging, cultural operations such as timber-stand improvement, land-clearing, or changes in land use during the period between surveys and converted to an annual basis.

## FOREST-SURVEY METHODS

The forest area and timber volume estimates of Ohio were obtained by combining the results of two independent inventories. One was based on the updating of the initial survey (1952). This procedure required the remeasurement of a subsample of the initial inventory ground plots. With the area change and current volume estimates obtained from the remeasured sample plots, regression techniques were used to update all the initial ground and photo plots to obtain an estimate of current timber volume and forest area.

The secondary inventory was also based on a large photo-plot sample with a subsample of ground plots. For the second measurement, the most recent aerial photography coverage of Ohio was used. Photo plots were pinpointed on each photograph to provide a uniformly distributed sample of the area. Each photo plot was examined stereoscopically and was classified as either forest or nonforest land. Those classified as forest plots were further stratified into cubic-foot-volume-per-acre classes. A subsample of these photo plots, which was selected to be proportional to the area in a photo class, was measured on the ground. From this ground measurement, estimates of the mean and variance of each photo class were obtained. These means were expanded by the photo-strata area to yield an independent estimate of forest area and timber volume.

The final estimates of current forest area and timber volume were developed by combining the two independent inventories. The combination process consisted of weighing each estimate by the reciprocal of its variance and then adding them. The associated sampling error for this new estimate was also obtained. These combined totals were partitioned into the various categories of area and volume (volume by species and d.b.h. class) using the data obtained from the new ground-plot sample.

In addition to estimating current timber volume and forest area, the forest survey of Ohio was designed to obtain an estimate of the components of change during the period between the initial and current inventories. The parameters of interest include area change from forest to nonforest and vice versa, timber growth, timber removals, and timber mortality. All this information was obtained from the remeasured plots. The timber-change parameters were obtained by a tree by tree reconciliation of each remeasured plot. Using the reconciliation code for each remeasured tree, estimates of the parameters of change were made by species. The estimates of change were expressed as an annual figure by dividing the total for the period by the number of years between measurements.

### Remeasured Phase

The initial forest inventory of Ohio consisted of a large photo-plot sample plus a ground measurement of a subsample of these photo plots. The photo plots were stratified according to land use as forest or nonforest. The forest plots were further classified into stand-size classes. Nearly 2,400 ground plots were measured by field crews during this first inventory. These ground samples were $\frac{1}{5}$-acre circular radius plots.

At this second measurement occasion, a sample of 582 of the initial ground plots, selected randomly within each initial plot class, was revisited. These plots were distributed within the geographic units of Ohio as follows:

| *The Hill Country* | *The Glaciated Region* |
|---|---|
| South-central Unit — 117 | Northeastern Unit — 128 |
| Southeastern Unit — 106 | Western Unit — 122 |
| East-central Unit — 109 | |

The plot center was relocated for each remeasured plot. On those plots that were forested, all the trees on the $\frac{1}{5}$-acre were tallied. The new tally was reconciled with the initial tally to account for every tree at both occasions.

## New Ground Phase

The source of the new independent estimates of volume and forest area was a new photo stratification with a subsample of ground measurements. The photo sample of Ohio consisted of 100,880 photo points on 1964-65 aerial photography. A subset of 3,988 of these photo plots were located on the ground. Land use was verified and tree-measurement data were recorded for the forest plots. Unlike the initial inventory where fixed-radius $\frac{1}{5}$-acre plots were tallied, the new ground plots consisted of a cluster of 10 prism points systematically covering approximately 1 acre. At each point, trees were selected for tally, using a prism with a basal-area factor of 37.5. Area attribute data were also tallied at each of the 10 points.

The 3,988 ground plots in Ohio were distributed within geographic strata as follows:

| The Hill Country | The Glaciated Region |
|---|---|
| South-central Unit — 760 | Northeastern Unit —   540 |
| Southeastern Unit — 495 | Western Unit     — 1,348 |
| East-central Unit   — 767 | |

## County Data

In recent years users of forest-survey data have shown a need for county information. To provide such information, within the framework of the survey design, county tables have been developed based on a survey unit partitioning technique. First the survey unit means and variances for the various photo-plot strata are applied to the photo-plot data for each county within the survey unit. This yields an estimate of total volume or total commercial forest land area for each county. Next, the data from all the new ground plots in the unit are used to partition the county totals into their various components. For example, if a table of cubic-foot volume by softwoods and hardwoods is to be made for a county, the estimate of total cubic-foot volume for that county is partitioned into softwood and hardwood totals according to the proportion of softwoods and hardwoods for all new forest-survey ground plots within the unit.

## Wayne National Forest

A separate inventory of the approximately 120,000 acres of forest land comprising the Wayne National Forest was conducted by the inventory staff of the National Forest Administration, Region 9. This inventory was designed to estimate current volume and commercial forest area, using the photo stratification of the most recent aerial photography. The photo stratification of 5,635 points was only on the basis of forest-nonforest area. No attempt was made to estimate forest photo volume classes. A subsample of 78 of the photo plots was located and measured on the ground to estimate volume and area means and variances. These means were expanded by the photo stratification to obtain an estimate of total volume and area. The totals were partitioned, based on the measurement data from the ground sample plots. The regular forest-survey plots were excluded from the national forest land and this separate inventory was added to obtain the State total.

## Comparisons Between Inventories

After inventories have been completed for several points in time, it is desirable to evaluate the trends between the several inventories and to make comparisons. A comparison of the 1968 and 1952 forest-survey estimates of volume, growth, removals, and mortality was made of Ohio. A computer program TRAS (Timber Resource Analysis System) was utilized.

Since the survey unit boundaries were different at the first occasion, no direct comparisons can be made between units. The present units will be used for the third inventory so comparisons between units will be possible at that time. The procedure for obtaining county data (See *Forest-Survey Methods*) does not make possible comparisons of inventory trend for a county.

The initial and the second estimates of softwood inventory volume are directly comparable for the State. However, this is not the situation for the hardwood portion of the inventory volume. The reason for this is a significant change in the procedure for classifying a growing-stock tree since the 1952 forest survey.

In the original inventory, any tree with an 8-foot sawlog that met grade requirements, or had the potential for producing such a sawlog, was classed as a growing-stock tree. The current definition of growing stock requires the tree to have now or potentially at least one 12-foot sawlog meeting grade requirements. This change has resulted in many trees, especially hardwoods, being reclassified from growing stock to the rough and/or rotten category.

Consequently, in comparing the 1952 hardwood inventory volumes with the 1968 inventory, the 1952 hardwood data had to be adjusted to reflect this change in standards. It should be noted that the major portion of the hardwood trees that would no longer meet the growing-stock sawlog-length requirement were located in the Glaciated Region. Thus, any comparisons that are made for only the Hill Country can be made directly between the 1952 and the 1968 hardwood inventory estimates.

## Reliability of the Estimates

The forest-area and timber-volume data presented in this report are based upon a carefully designed sample of forest conditions throughout Ohio. However, since neither every acre nor every tree in the State was measured, the data presented in this report are estimates. A measure of the reliability of these estimates is given by a sampling error. Each estimate in this report has had an associated sampling error calculated for it. These appear in the data tables.

Briefly, this is how the sampling error indicates the reliability of an estimate. Our estimate of the total growing-stock volume in Ohio, 4,181 million cubic feet, has an associated sampling error of 1.5 percent (62.7 million cubic feet). This means that our best estimate of the total growing-stock volume in Ohio in 1968 is 4,181 million cubic feet. If there are no errors in procedure, the odds are 2 to 1 that, if we repeated the survey in the same way, the resulting estimate of growing-stock volume would be between 4,118 million and 4,244 million cubic feet (4,181 ± 63). Similarly, the odds are 19 to 1 that it would be within ± 125 million cubic feet and 300 to 1 that it would be within 188 million cubic feet.

The computed sampling error is not a complete measure of reliability. There are other sources of error that this term does not include. There could be imperfections in our volume tables and equations and errors in field measurement. Procedural errors were kept to a minimum by careful training of all personnel, frequent inspection of field work, and application of the most reliable survey methods.

Computed sampling errors for the totals shown in the statistical tables are:

|  | Sampling error (percent) |
|---|---|
| Commercial forest area (4.4 million acres) | 1.6 |
| Growing-stock volume (4.2 billion cubic feet) | 1.5 |
| Sawtimber volume (14.6 billion board feet) | 1 |
| Average net annual growth (132.8 million cubic feet) | 9 |
| Average annual removals (70.5 million cubic feet) | 14 |

## COMMON COMMERCIAL SPECIES OF OHIO[3]

### Softwoods

| | |
|---|---|
| Eastern redcedar | *Juniperus virginiana* |
| Norway spruce | *Picea abies* |
| Shortleaf pine | *Pinus echinata* |
| Red (Norway) pine | *P. resinosa* |
| Pitch pine | *P. rigida* |
| Eastern white pine | *P. strobus* |
| Scotch pine | *P. sylvestris* |
| Virginia pine | *P. virginiana* |
| Baldcypress | *Taxodium distichum* |
| Northern white-cedar | *Thuja occidentalis* |
| Eastern hemlock | *Tsuga canadensis* |

### Hardwoods

| | |
|---|---|
| Boxelder | *Acer negundo* |
| Black (hard) maple | *A. nigrum* |
| Red maple | *A. rubrum* |
| Silver maple | *A. saccharinum* |
| Sugar (hard) maple | *A. saccharum* |
| Ohio buckeye | *Aesculus glabra* |
| Yellow buckeye | *A. octandra* |
| Yellow birch | *Betula allegheniensis* |
| Sweet (black) birch | *B. lenta* |
| Red (river) birch | *B. nigra* |
| Paper (white) birch | *B. papyrifera* |
| American hornbeam (Blue beech) | *Carpinus caroliniana* |
| Hickory species | *Carya spp.* |

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[3] Little, Elbert L., Jr. CHECK LIST OF NATIVE AND NATURALIZED TREES OF THE UNITED STATES (INCLUDING ALASKA). U. S. Dep. Agr., Agr. Handbook 41, 472 pp. 1953.

| | |
|---|---|
| Southern catalpa | *Catalpa bignonioides* |
| Northern catalpa | *C. speciosa* |
| Hackberry species | *Celtis spp.* |
| Persimmon | *Diospyros virginiana* |
| American beech | *Fagus grandifolia* |
| White ash | *Fraxinus americana* |
| Black ash | *F. nigra* |
| Green ash | *F. pennsylvanica* |
| Blue ash | *F. quadrangulata* |
| Honey locust | *Gleditsia triacanthos* |
| Kentucky coffeetree | *Gymnocladus dioicus* |
| Butternut | *Juglans cinerea* |
| Black walnut | *J. nigra* |
| Sweetgum | *Liquidambar styraciflua* |
| Yellow-poplar | *Liriodendron tulipifera* |
| Osage-orange | *Maclura pomifera* |
| Red mulberry | *Morus rubra* |
| Water tupelo | *Nyssa aquatica* |
| American sycamore (Buttonwood) | *Platanus americana* |
| Eastern cottonwood | *Populus deltoides* |
| Bigtooth aspen | *P. grandidentata* |
| Swamp cottonwood | *P. heterophylla* |
| Quaking aspen | *P. tremuloides* |
| Black cherry | *Prunus serotina* |
| White oak* | *Quercus alba* |
| Swamp white oak* | *Q. bicolor* |
| Scarlet oak | *Q. coccinea* |
| Southern red oak | *Q. falcata* |
| Cherrybark oak** | *Q. falcata var. pagodaefolia* |
| Overcup oak | *Q. lyrata* |
| Bur oak* | *Q. macrocarpa* |
| Swamp chestnut oak* | *Q. michauxii* |
| Chinkapin oak* | *Q. muehlenbergii* |
| Water oak | *Q. nigra* |
| Pin oak | *Q. palustris* |
| Willow oak | *Q. phellos* |
| Chestnut oak | *Q. prinus* |
| Northern red oak** | *Q. rubra* |
| Shumard oak** | *Q. shumardii* |
| Post oak | *Q. stellata* |
| Black oak | *Q. velutina* |
| Black locust | *Robinia pseudoacacia* |
| Willow species | *Salix spp.* |
| Sassafras | *Sassafras albidum* |
| Basswood | *Tilia americana* |
| Winged elm | *Ulmus alata* |
| American (white) elm | *U. americana* |
| Slippery elm | *U. rubra* |
| Rock elm | *U. thomasii* |

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** Select white oaks.
* Select red oaks.

## Table 1.—Area by land classes, Ohio, 1968

| Land class | Area | |
|---|---|---|
| | *Thousand acres* | *Percent* |
| Forest land: | | |
|    Commercial | 6,329.2 | 24 |
|    Productive-reserved | 76.1 | [1] |
|    Unproductive | — | — |
|      Total | 6,405.3 | 24 |
| Nonforest: | | |
|    Cropland[2] | 11,863.8 | 46 |
|    Pasture[2] | 2,177.1 | 8 |
|    Other[3] | 5,805.1 | 22 |
|      Total | 19,846.0 | 76 |
| Total area[4] | 26,251.3 | 100 |

[1] Less than 0.5 percent.

[2] Source: 1964 Census of Agriculture.

[3] Includes swampland, industrial and urban areas, other nonforest land, and 80,500 acres classed as water by Forest Survey standards but defined by the Bureau of the Census as land.

[4] Source: United States Bureau of the Census, Area Management Reports, Ohio, 1960. Sept. 1967.

Sampling errors for major breakdowns of area for tables 1 to 9 are given in table 10.

#### Table 2.—Area of commercial forest land, by ownership classes, Ohio, 1968

| Ownership class | Area | |
|---|---|---|
| | *Thousand acres* | *Percent* |
| National Forest | 112.3 | 2 |
| Other Federal | 8.7 | (*) |
| Total Federal | 121.0 | 2 |
| State | 222.7 | 4 |
| County and municipal | 4.0 | (*) |
| Total public | 347.7 | 6 |
| Forest industry: | | |
|     Pulp and paper | 98.3 | 2 |
|     Lumber | 17.6 | (*) |
|     Other | 10.9 | (*) |
| Total forest industry | 126.8 | 2 |
| Farmer-owned[1] | 2,687.9 | 42 |
| Miscellaneous private | 3,166.8 | 50 |
| Total private | 5,981.5 | 94 |
| All ownerships | 6,329.2 | 100 |

*Less than 0.5 percent.
[1] Estimate based upon sample plots; not from Census of Agriculture.

#### Table 3.—Area of commercial forest land, by stand-size and ownership classes, Ohio, 1968
(In thousands of acres)

| Stand-size class | All ownerships | National Forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| Sawtimber stands | 1,948.1 | 56.9 | 119.9 | 59.4 | 1,711.9 |
| Poletimber stands | 690.1 | 11.1 | 34.3 | 14.9 | 629.8 |
| Sapling and seedling stands | 3,517.3 | 28.5 | 78.1 | 52.5 | 3,358.2 |
| Nonstocked areas | 173.7 | 15.8 | 3.1 | — | 154.8 |
| All classes | 6,329.2 | 112.3 | 235.4 | 126.8 | 5,854.7 |

**Table 4.—Area of commercial forest land, by stand-volume and ownership classes, Ohio, 1968**

(In thousands of acres)

| Stand volume per acre (board feet)[1] | All ownerships | National Forest | Other public | Forest industry | Farmer private and misc. |
|---|---|---|---|---|---|
| Less than 1,500 | 3,079.9 | 44.3 | 72.2 | 34.2 | 2,929.2 |
| 1,500 to 5,000 | 2,320.9 | 34.8 | 64.7 | 55.6 | 2,165.8 |
| More than 5,000 | 928.4 | 33.2 | 98.5 | 37.0 | 759.7 |
| All classes | 6,329.2 | 112.3 | 235.4 | 126.8 | 5,854.7 |

[1] International ¼-inch rule.

**Table 5.—Area of commercial forest land, by stocking classes based on selected stand components, Ohio, 1968**

(In thousands of acres)

| Stocking class (percent) | Stocking classified in terms of — | | | | |
|---|---|---|---|---|---|
| | All trees | Growing-stock trees | Desirable trees | Acceptable trees | Rough and rotten trees |
| 160 | 24.3 | — | — | — | — |
| 150 to 160 | 73.6 | 7.5 | — | 3.3 | — |
| 140 to 150 | 420.1 | 16.9 | — | 19.0 | 25.4 |
| 130 to 140 | 759.2 | 69.6 | 4.2 | 55.6 | 7.9 |
| 120 to 130 | 1,137.0 | 192.5 | — | 120.5 | 18.1 |
| 110 to 120 | 1,250.6 | 326.4 | — | 300.4 | 12.5 |
| 100 to 110 | 904.1 | 635.6 | — | 461.7 | 54.4 |
| 90 to 100 | 706.4 | 701.0 | — | 588.6 | 113.9 |
| 80 to 90 | 403.9 | 829.3 | 2.9 | 823.4 | 174.3 |
| 70 to 80 | 264.1 | 806.5 | 1.6 | 916.1 | 336.4 |
| 60 to 70 | 127.6 | 761.6 | 11.4 | 823.6 | 524.7 |
| 50 to 60 | 110.0 | 708.5 | 32.2 | 744.0 | 651.2 |
| 40 to 50 | 53.3 | 481.3 | 58.4 | 582.9 | 863.9 |
| 30 to 40 | 80.6 | 357.5 | 203.6 | 380.1 | 1,083.1 |
| 20 to 30 | 7.1 | 260.3 | 354.2 | 283.5 | 1,127.1 |
| 10 to 20 | 7.3 | 86.0 | 1,096.4 | 116.8 | 884.6 |
| Less than 10 | — | 88.7 | 4,564.3 | 109.7 | 451.7 |
| Total | 6,329.2 | 6,329.2 | 6,329.2 | 6,329.2 | 6,329.2 |

Table 5a.—*Percent of commercial forest land, by stocking classes based on selected stand components, Ohio, 1968*

| Level of stocking | Stocking in terms of selected stand components expressed as a percent of all stands | | | |
|---|---|---|---|---|
| | All trees | Growing-stock trees | Desirable trees | Acceptable trees |
| Overstocked | 20 | 2 | ([1]) | 1 |
| Fully stocked | 52 | 18 | — | 14 |
| Medium stocking | 22 | 37 | ([1]) | 37 |
| Poorly stocked and nonstocked | 6 | 43 | 100 | 48 |
| All levels | 100 | 100 | 100 | 100 |

[1] Less than 0.5 percent.

Table 6.—*Area of commercial forest land, by area condition and ownership classes, Ohio, 1968*

(In thousands of acres)

| Area-condition class[1] | All ownerships | National Forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| Class 10 | 4.2 | — | — | 4.2 | — |
| Class 20 | — | — | — | — | — |
| Class 30 | — | — | — | — | — |
| Class 40 | 10.4 | 1.6 | 2.6 | — | 6.2 |
| Class 50 | 916.9 | — | 42.1 | 29.2 | 845.6 |
| Class 60 | 3,137.9 | 34.8 | 118.0 | 73.4 | 2,911.7 |
| Class 70 | 2,259.8 | 75.9 | 72.7 | 20.0 | 2,091.2 |
| All classes | 6,329.2 | 112.3 | 235.4 | 126.8 | 5,854.7 |

[1] Area-condition classes are defined as follows:

Class 10.—Areas fully stocked with desirable trees and not overstocked.
Class 20.—Areas fully stocked with desirable trees, but overstocked with all live trees.
Class 30.—Areas medium to fully stocked with desirable trees, and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.
Class 40.—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.
Class 50.—Areas poorly stocked with desirable trees, but fully stocked with growing-stock trees.
Class 60.—Areas poorly stocked with desirable trees but with medium to full stocking of growing-stock trees.
Class 70.—Areas poorly stocked with desirable trees, and poorly stocked with growing-stock trees.

**Table 7.—Area of commercial forest land, by site and ownership classes, Ohio, 1968**

(In thousands of acres)

| Site class (cubic feet per acre) | All ownerships | National Forest | Other public | Forest industry | Farmer and misc. private |
|---|---|---|---|---|---|
| 165 or more | — | — | — | — | — |
| 120 to 165 | 600.00 | — | 44.6 | 6.5 | 548.9 |
| 85 to 120 | 1,059.2 | 4.8 | 51.2 | 22.4 | 980.8 |
| 50 to 85 | 2,613.4 | 91.7 | 65.0 | 53.0 | 2,403.7 |
| Less than 50 | 2,056.6 | 15.8 | 74.6 | 44.9 | 1,921.3 |
| All classes | 6,329.2 | 112.3 | 235.4 | 126.8 | 5,854.7 |

**Table 8.—Area of commercial forest land by forest types and ownership classes, Ohio, 1968**

(In thousands of acres)

| Forest type | All ownerships | Public ownerships | Private ownerships |
|---|---|---|---|
| White-red pine-hemlock | 54.3 | 7.6 | 46.7 |
| Spruce-fir[1] | 19.2 | — | 19.2 |
| Virginia-pitch pine | 206.0 | 31.0 | 175.0 |
| Oak-pine | 478.7 | 10.7 | 468.0 |
| Oak-hickory | 2,953.8 | 246.2 | 2,707.6 |
| Oak-gum | 26.0 | — | 26.0 |
| Elm-ash-red maple | 1,376.0 | 22.6 | 1,353.4 |
| Maple-beech-birch | 1,151.6 | 20.5 | 1,131.1 |
| Aspen-birch | 63.6 | 9.1 | 54.5 |
| All types | 6,329.2 | 347.7 | 5,981.5 |

[1] In Ohio this type is composed entirely of spruce plantations.

Table 9.—Area of noncommercial forest land, by forest types, Ohio, 1968

(In thousands of acres)

| Forest types | All areas | Productive-reserved areas | Unproductive areas |
|---|---|---|---|
| Softwood types | 2.6 | 2.6 | — |
| Oak types | 48.6 | 48.6 | — |
| Maple-beech-birch | 16.2 | 16.2 | — |
| Other hardwood types | 8.7 | 8.7 | — |
| All types | 76.1 | 76.1 | — |

**Table 10.—Sampling errors, in percent, for major area breakdowns in Ohio, 1968**

| Table no. | Area breakdown classification | Sampling error | Table no. | Area breakdown classification | Sampling error |
|---|---|---|---|---|---|
| 1 | Forest land area: | | 5 | Area-condition class: | |
| | Commercial | 1.6 | | 1 | (**) |
| | Unproductive | — | | 2 & 3 | — |
| | Total | 1.6 | | 4 | (*) |
| 2 | Ownership:[1] | | | 5 | 7 |
| | Farmer-owned | 4 | | 6 | 3 |
| | Misc. private | 3 | | 7 | 4 |
| | Forest industry | 16 | 6 | Growth-per-acre class: | |
| | Farmer & misc. private | 2 | | More than 120 cubic feet | 10 |
| 3 | Stand-size class: | | | 85 to 120 cubic feet | 7 |
| | Sawtimber | 4 | | 50 to 85 cubic feet | 4 |
| | Poletimber | 7 | | Less than 50 cubic feet | 4 |
| | Sapling and seedling | 3 | 7 | Forest types: | |
| | Nonstocked | 19 | | White-red pine-hemlock | 30 |
| 4 | Stand-volume per acre: | | | Spruce-fir | (*) |
| | Less than 1,500 board feet | 3 | | Virginia-pitch pine | 14 |
| | 1,500 to 5,000 board feet | 4 | | Oak-pine | 12 |
| | More than 5,000 board feet | 7 | | Oak-hickory | 3 |
| | | | | Oak-gum-cypress | 42 |
| | | | | Elm-ash-red maple | 6 |
| | | | | Maple-beech-birch | 7 |
| | | | | Aspen-birch | 27 |

* Sampling errors of 50 to 99 percent.
** Sampling errors of 100 percent or more.
[1] There are no sampling errors for areas in public ownership because acreages were obtained from public records.

Table 11.—*Number of growing-stock trees on commercial forest land, by diameter classes and by softwoods and hardwoods, Ohio, 1968*

(In thousands of trees)

| D.b.h. class (inches) | All species | Softwoods | Hardwoods |
|---|---|---|---|
| 1.0- 2.9 | 860,452 | 36,377 | 824,075 |
| 3.0- 4.9 | 335,054 | 23,277 | 311,777 |
| 5.0- 6.9 | 159,578 | 9,374 | 150,204 |
| 7.0- 8.9 | 100,651 | 5,273 | 95,378 |
| 9.0-10.9 | 62,420 | 2,464 | 59,956 |
| 11.0-12.9 | 40,393 | 1,116 | 39,277 |
| 13.0-14.9 | 25,601 | 447 | 25,154 |
| 15.0-16.9 | 15,343 | 109 | 15,234 |
| 17.0-18.9 | 8,641 | 80 | 8,561 |
| 19.0-28.9 | 9,645 | 22 | 9,623 |
| 29.0 and larger | 676 | — | 676 |
| All classes | 1,618,454 | 78,539 | 1,539,915 |

Table 12.—*Number of cull and growing-stock trees on commercial forest land, by diameter groups and by softwoods and hardwoods, Ohio 1968*

(In thousands of trees)

| D.b.h. class (inches) | All trees[1] | Cull trees | Growing-stock trees |
|---|---|---|---|
| Softwoods: | | | |
| 5.0 to 8.9 | 17,283 | 2,636 | 14,647 |
| 9.0 to 18.9 | 4,677 | 461 | 4,216 |
| 19.0 and larger | 22 | — | 22 |
| Total | 21,982 | 3,097 | 18,885 |
| Hardwoods: | | | |
| 5.0 to 10.9 | 422,352 | 116,814 | 305,538 |
| 11.0 to 18.9 | 109,617 | 21,391 | 88,226 |
| 19.0 and larger | 16,396 | 6,097 | 10,299 |
| Total | 548,365 | 144,302 | 404,063 |
| All species | 570,347 | 147,399 | 422,948 |

[1] Number of salvable dead trees is negligible; therefore this item is omitted.

**Table 13.—Net volume of timber on commercial forest land, by class of timber, and softwoods and hardwoods, Ohio, 1968**

(In millions of cubic feet)

| Class of timber | All species | Softwoods | Hardwoods |
|---|---|---|---|
| Sawtimber trees: | | | |
|     Sawlog portion | 2,188.4 | 54.2 | 2,134.2 |
|     Upper-stem portion | 495.2 | 8.2 | 487.0 |
|         Total | 2,683.6 | 62.4 | 2,621.2 |
| Poletimber trees | 1,497.3 | 53.5 | 1,443.8 |
| All growing-stock trees | 4,180.9 | 115.9 | 4,065.0 |
| Rough trees | 391.6 | 7.2 | 384.4 |
| Rotten trees | 283.7 | 1.6 | 282.1 |
|     Total, all timber | 4,856.2 | 124.7 | 4,731.5 |

Sampling errors for major breakdowns of timber volume for tables 13 to 18 are given in table 19.

**Table 14.—Net volume of growing stock and sawtimber on commercial forest land, by ownership classes, and softwoods and hardwoods, Ohio, 1968**

| Ownership class | Growing stock (million cubic feet) | | | Sawtimber (million board feet)[1] | | |
|---|---|---|---|---|---|---|
| | All species | Softwoods | Hardwoods | All species | Softwoods | Hardwoods |
| National Forest | 100.9 | 8.1 | 92.8 | 366.0 | 22.1 | 343.9 |
| Other public | 251.6 | 10.8 | 240.8 | 916.3 | 33.7 | 882.6 |
| Forest industry | 116.5 | 4.4 | 112.1 | 425.9 | 18.2 | 407.7 |
| Farmer and misc. private | 3,711.9 | 92.6 | 3,619.3 | 12,843.4 | 275.5 | 12,567.9 |
| All ownerships | 4,180.9 | 115.9 | 4,065.0 | 14,551.6 | 349.5 | 14,202.1 |

[1] International ¼-inch rule.

**Table 15.—Volume of growing stock and sawtimber on commercial forest land, by stand-size classes and by softwoods and hardwoods, Ohio, 1968**

| Stand-size class | Growing stock (million cubic feet) | | | Sawtimber (million board feet)[1] | | |
|---|---|---|---|---|---|---|
| | All species | Softwoods | Hardwoods | All species | Softwoods | Hardwoods |
| Sawtimber stands | 2,427.5 | 40.4 | 2,387.1 | 10,049.1 | 168.0 | 9,881.1 |
| Poletimber stands | 643.5 | 45.9 | 597.6 | 1,362.5 | 92.6 | 1,269.9 |
| Sapling and seedling stands | 1,097.3 | 29.6 | 1,067.7 | 3,106.7 | 88.9 | 3,017.8 |
| Nonstocked areas | 12.6 | — | 12.6 | 33.3 | — | 33.3 |
| Total | 4,180.9 | 115.9 | 4,065.0 | 14,551.6 | 349.5 | 14,202.1 |

[1] International ¼-inch rule.

Table 16.—Net volume of growing stock on commercial forest land, by species and diameter classes, Ohio, 1968

(In millions of cubic feet)

| Species | All classes | Diameter class (inches at breast height) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 26.1 | 7.7 | 9.4 | 4.1 | 2.9 | 1.2 | 0.6 | — | — | 0.2 | — |
| Virginia pine | 51.0 | 6.3 | 14.1 | 13.2 | 10.4 | 5.5 | .5 | 1.0 | — | — | — |
| Other yellow pines | 23.8 | 4.3 | 5.2 | 4.5 | 3.5 | 2.6 | 1.8 | 1.5 | 0.2 | .2 | — |
| Hemlock | 7.7 | .8 | 1.8 | 1.8 | 1.3 | .5 | .3 | .5 | — | .7 | — |
| Other softwoods | 7.3 | 2.3 | 1.6 | 2.1 | .6 | .4 | — | — | — | — | 0.3 |
| Total softwoods | 115.9 | 21.4 | 32.1 | 25.7 | 18.7 | 10.2 | 3.2 | 3.0 | .2 | 1.1 | .3 |
| Select white oaks | 593.0 | 29.0 | 51.2 | 74.3 | 90.1 | 95.7 | 73.2 | 53.3 | 31.2 | 72.0 | 23.0 |
| Select red oaks | 312.9 | 13.9 | 28.9 | 34.5 | 36.3 | 33.1 | 31.7 | 34.0 | 21.6 | 65.5 | 13.4 |
| Chestnut oak[1] | 252.0 | 14.4 | 30.0 | 43.1 | 47.6 | 38.0 | 33.1 | 18.3 | 12.1 | 14.7 | .7 |
| Other red oaks | 432.2 | 12.7 | 34.5 | 56.3 | 63.5 | 61.7 | 56.0 | 51.5 | 30.8 | 52.7 | 12.5 |
| Hickory species | 482.5 | 50.3 | 92.8 | 87.6 | 86.1 | 63.1 | 44.2 | 27.4 | 17.6 | 13.4 | — |
| Hard maple | 239.9 | 25.3 | 37.1 | 33.5 | 37.0 | 36.4 | 24.4 | 16.5 | 9.5 | 17.1 | 3.1 |
| Soft maple | 227.4 | 25.9 | 35.3 | 40.5 | 24.5 | 27.9 | 18.7 | 19.3 | 8.7 | 18.7 | 7.9 |
| Beech | 150.1 | 8.5 | 10.8 | 13.0 | 20.4 | 15.6 | 17.6 | 14.4 | 16.6 | 28.5 | 4.7 |
| Ash species | 269.4 | 26.3 | 31.6 | 40.9 | 46.6 | 39.4 | 32.3 | 18.6 | 16.9 | 16.3 | .5 |
| Aspen and cottonwood | 55.0 | 13.2 | 14.1 | 6.8 | 6.0 | 5.9 | 3.2 | .9 | .3 | 1.3 | 3.3 |
| Basswood | 47.3 | 1.8 | 1.9 | 8.4 | 7.6 | 7.3 | 7.5 | 5.2 | 2.5 | 2.7 | 2.4 |
| Yellow-poplar | 265.8 | 16.3 | 27.8 | 35.8 | 40.0 | 45.9 | 38.1 | 22.2 | 14.0 | 23.0 | 2.7 |
| Black walnut[2] | 98.8 | 11.3 | 14.6 | 18.6 | 16.9 | 11.6 | 13.9 | 4.9 | 4.4 | 2.6 | — |
| Black cherry | 122.1 | 15.3 | 26.2 | 23.3 | 21.4 | 16.9 | 10.8 | 3.7 | 2.3 | 2.2 | — |
| Sycamore | 78.0 | 3.1 | 4.5 | 5.4 | 6.0 | 7.4 | 11.7 | 8.2 | 7.0 | 11.1 | 13.6 |
| Black locust | 45.6 | 10.5 | 11.6 | 10.9 | 4.0 | 4.0 | 1.3 | 2.8 | .5 | — | — |
| Elm | 243.9 | 26.8 | 39.1 | 42.9 | 36.6 | 31.6 | 27.1 | 15.0 | 7.1 | 9.5 | 8.2 |
| Sassafras | 30.4 | 10.1 | 10.8 | 3.6 | 3.1 | 1.9 | .2 | .7 | — | — | — |
| Other hardwoods | 118.7 | 10.9 | 20.0 | 16.0 | 17.8 | 15.3 | 12.4 | 12.6 | 5.5 | 5.8 | 2.4 |
| Total hardwoods | 4,065.0 | 325.6 | 522.8 | 595.4 | 611.5 | 558.7 | 457.4 | 329.5 | 208.6 | 357.1 | 98.4 |
| All species | 4,180.9 | 347.0 | 554.9 | 621.1 | 630.2 | 568.9 | 460.6 | 332.5 | 208.8 | 358.2 | 98.7 |

[1] Includes 6.0 million cubic feet of other white oaks.
[2] In addition there are 14.7 million cubic feet of black walnut on noncommercial and nonforest land.

Table 17.—Net volume of sawtimber on commercial forest land, by species and diameter classes, Ohio, 1968
(In millions of board feet)[1]

| Species | All classes | Diameter class (inches at breast height) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 51.4 | 21.9 | 17.2 | 7.1 | 3.8 | — | — | 1.4 | — |
| Virginia pine | 167.7 | 67.0 | 57.8 | 33.0 | 3.1 | 6.8 | — | — | — |
| Other yellow pines | 81.5 | 21.8 | 20.3 | 15.9 | 11.8 | 9.2 | 1.6 | .9 | — |
| Hemlock | 28.5 | 9.1 | 7.3 | 2.9 | 1.5 | 3.5 | — | 4.2 | — |
| Other softwoods | 20.4 | 11.8 | 3.8 | 2.9 | — | — | — | — | 1.9 |
| Total softwoods | 349.5 | 131.6 | 106.4 | 61.8 | 20.2 | 19.5 | 1.6 | 6.5 | 1.9 |
| Select white oaks | 2,359.6 | — | 482.5 | 528.0 | 397.2 | 282.9 | 170.8 | 382.5 | 115.7 |
| Select red oaks | 1,239.6 | — | 178.4 | 177.9 | 166.4 | 180.1 | 117.9 | 348.6 | 70.3 |
| Chestnut oak[2] | 846.4 | — | 236.6 | 195.5 | 173.6 | 94.1 | 64.3 | 78.5 | 3.8 |
| Other red oaks | 1,735.0 | — | 313.3 | 331.6 | 296.3 | 275.7 | 170.4 | 285.1 | 62.6 |
| Hickory species | 1,245.1 | — | 414.0 | 313.0 | 221.9 | 137.0 | 90.2 | 69.0 | — |
| Hard maple | 810.3 | — | 204.2 | 207.2 | 141.1 | 93.3 | 55.6 | 92.4 | 16.5 |
| Soft maple | 782.4 | — | 147.9 | 174.5 | 116.1 | 122.7 | 56.4 | 118.6 | 46.2 |
| Beech | 777.4 | — | 134.3 | 106.3 | 119.1 | 94.1 | 110.8 | 182.2 | 30.6 |
| Ash species | 857.7 | — | 233.2 | 198.0 | 164.2 | 92.5 | 86.8 | 80.4 | 2.6 |
| Aspen and cottonwood | 108.8 | — | 31.2 | 31.1 | 17.5 | 5.1 | 1.3 | 6.9 | 15.7 |
| Basswood | 183.7 | — | 38.4 | 39.0 | 40.3 | 27.5 | 14.3 | 13.7 | 10.5 |
| Yellow-poplar | 1,099.1 | — | 228.8 | 271.3 | 226.1 | 132.2 | 85.2 | 139.1 | 16.4 |
| Black walnut[3] | 300.0 | — | 92.5 | 67.3 | 78.9 | 25.2 | 22.4 | 13.7 | — |
| Black cherry | 297.7 | — | 106.9 | 88.0 | 57.6 | 20.4 | 13.4 | 11.4 | — |
| Sycamore | 342.6 | — | 32.4 | 39.9 | 63.9 | 43.3 | 38.4 | 58.3 | 66.4 |
| Black locust | 69.4 | — | 21.3 | 22.1 | 7.1 | 16.0 | 2.9 | — | — |
| Elm | 740.5 | — | 201.3 | 174.1 | 150.7 | 82.7 | 38.9 | 50.7 | 42.1 |
| Sassafras | 32.0 | — | 16.8 | 9.9 | 1.2 | 4.1 | — | — | — |
| Other hardwoods | 374.8 | — | 92.0 | 81.6 | 65.4 | 66.1 | 28.5 | 30.4 | 10.8 |
| Total hardwoods | 14,202.1 | — | 3,206.0 | 3,056.3 | 2,504.6 | 1,795.0 | 1,168.5 | 1,961.5 | 510.2 |
| All species | 14,551.6 | 131.6 | 3,312.4 | 3,118.1 | 2,524.8 | 1,814.5 | 1,170.1 | 1,968.0 | 512.1 |

[1] International 1/4-inch rule.
[3] In addition there are 26.4 million board feet of black walnut on noncommercial and nonforest land.

Table 18.—*Net volume of sawtimber on commercial forest land, by species and quality classes, Ohio, 1968*

(In millions of board feet)[1]

| Species | All classes | Standard-lumber logs | | | Other logs[2] |
|---|---|---|---|---|---|
| | | Grade 1 | Grade 2 | Grade 3 | |
| **Softwoods:** | | | | | |
| Virginia pine | 167.7 | 1.3 | 7.3 | 118.9 | 40.2 |
| Yellow pines | 81.5 | 2.6 | 15.1 | 44.1 | 19.7 |
| White and red pine | 51.4 | — | — | 34.2 | 17.2 |
| Hemlock | 28.5 | — | — | — | — |
| Other softwoods | 20.4 | — | — | — | — |
| Total | 349.5 | 3.9 | 22.4 | 197.2 | 77.1 |
| **Hardwoods:** | | | | | |
| Select white oaks | 2,359.6 | 261.0 | 595.6 | 1,133.8 | 369.2 |
| Select red oaks | 1,239.6 | 288.7 | 299.3 | 508.6 | 143.0 |
| Chestnut oak[3] | 846.4 | 96.3 | 221.5 | 396.7 | 131.9 |
| Other red oaks | 1,735.0 | 273.4 | 319.5 | 792.7 | 349.4 |
| Hickory species | 1,245.1 | 87.2 | 194.6 | 586.2 | 377.1 |
| Hard maple | 810.3 | 66.6 | 156.6 | 454.5 | 132.6 |
| Soft maple | 782.4 | 47.7 | 162.2 | 414.0 | 158.5 |
| Beech | 777.4 | 24.3 | 124.2 | 415.8 | 213.1 |
| Ash species | 857.7 | 134.0 | 194.4 | 368.4 | 160.9 |
| Aspen and cottonwood | 108.8 | 13.5 | 17.0 | 46.2 | 32.1 |
| Basswood | 183.7 | 14.9 | 39.8 | 113.5 | 15.5 |
| Yellow-poplar | 1,099.1 | 216.4 | 228.4 | 441.5 | 212.8 |
| Black walnut | 300.0 | 28.8 | 62.8 | 174.8 | 33.6 |
| Black cherry | 297.7 | 22.4 | 31.6 | 164.5 | 79.2 |
| Sycamore | 342.6 | 92.1 | 83.8 | 132.1 | 34.6 |
| Black locust | 69.4 | 3.2 | 7.5 | 48.0 | 10.7 |
| Elm | 740.5 | 53.8 | 151.9 | 412.0 | 122.8 |
| Sassafras | 32.0 | .7 | 4.4 | 22.9 | 4.0 |
| Other hardwoods | 374.8 | 47.4 | 78.2 | 192.7 | 56.5 |
| Total | 14,202.1 | 1,772.4 | 2,973.3 | 6,818.9 | 2,637.5 |

[1] International ¼-inch rule.
[2] For white, red, and yellow pines "other" is grade 4; for hardwoods "other" is tie and timber logs. Other softwood species were not graded. For a discussion of log grades see the appendix.
[3] Includes a small volume of other white oaks.

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Table 19.—*Sampling errors, in percent, for major timber volume breakdowns in Ohio, 1968*

| Table no. | Volume breakdown classification | Sampling errors | Table no. | Volume breakdown classification | Sampling errors Cu. ft. | Bd. ft. |
|---|---|---|---|---|---|---|
| | | *Percent* | | | *Percent* | |
| 13 | Class of timber (cubic feet): | | 16-17 | Species: | | |
| | Softwood growing stock | 14 | | White & red pine | 38 | 65 |
| | Hardwood growing stock | 2 | | Virginia pine | 16 | 18 |
| | Sawtimber trees | 2 | | Other yellow pines | 26 | 21 |
| | Poletimber trees | 3 | | Hemlock | * | * |
| | All growing stock | 1.5 | | Other softwoods | 43 | * |
| | Rough trees | 5 | | Select white oaks | 5 | 6 |
| | Rotten trees | 5 | | Select red oaks | 7 | 7 |
| | All live trees | 1.4 | | Chestnut oak | 8 | 9 |
| 14 | Ownership classes: | | | Other red oaks | 6 | 6 |
| | *Growing stock (cubic feet)* | | | Hickory species | 6 | 8 |
| | National Forest | 9 | | Hard maple | 10 | 13 |
| | Other public | 28 | | Soft maple | 10 | 13 |
| | Forest industry | 18 | | Beech | 13 | 14 |
| | Farmer & misc. pvt. | 2 | | Ash species | 7 | 8 |
| | *Sawtimber (board feet)* | | | Yellow-poplar | 8 | 9 |
| | National forest | 11 | | Aspen and cottonwood | 15 | 28 |
| | Other public | 31 | | Elm | 7 | 10 |
| | Forest industry | 19 | | Sassafrass | 14 | 26 |
| | Farmer & misc. pvt. | 2 | | Basswood | 20 | 22 |
| | Softwood sawtimber | 15 | | Black walnut | 9 | 12 |
| | Hardwood sawtimber | 2 | | Black cherry | 9 | 12 |
| | All sawtimber | 1 | | Sycamore | 19 | 22 |
| 15 | Stand-size classes: | | | Black locust | 13 | 23 |
| | *Growing stock (cubic feet)* | | | Other hardwoods | 9 | 12 |
| | Sawtimber stands | 3 | | | | |
| | Poletimber stands | 8 | 16-17 | Diameter classes: | | |
| | Sapling and seedling | 5 | | (inches) | *Cu. ft.* | *Bd. ft.* |
| | Nonstocked | 34 | | 5.0- 6.9 | 4 | — |
| | *Sawtimber (board feet)* | | | 7.0- 8.9 | 3 | — |
| | Sawtimber stands | 3 | | 9.0-10.9[1] | 3 | 27 |
| | Poletimber stands | 9 | | 11.0-12.9 | 3 | 3 |
| | Sapling and seedling | 6 | | 13.0-14.9 | 3 | 4 |
| | Nonstocked | 45 | | 15.0-16.9 | 1 | 3 |
| | | | | 17.0-18.9 | 4 | 4 |
| | | | | 19.0-20.9 | 6 | 5 |
| | | | | 21.0-28.9 | 6 | 6 |
| | | | | 29.0 and larger | 14 | 13 |

[1] Board-foot sampling error for this class is for softwoods only.
* Sampling errors of 50 to 99 percent.

Table 20.—*Average net annual growth and removals of growing stock on commercial forest land, by species, Ohio, 1951-1967*

(In thousands of cubic feet)

| Species | Average net annual growth | Average annual timber removals |
|---|---|---|
| Softwoods: | | |
| Yellow pines | 2,884 | 2,700 |
| White and red pine | 860 | — |
| Other softwoods | 456 | — |
| Total | 4,200 | 2,700 |
| Hardwoods: | | |
| Select white and red oaks | 29,496 | 13,823 |
| Other white and red oaks | 23,176 | 15,703 |
| Hickory | 12,799 | 3,201 |
| Hard maple | 8,577 | 2,414 |
| Soft maple | 6,638 | 1,054 |
| Beech | 2,291 | 2,825 |
| Ash, walnut, and black cherry | 21,347 | 7,607 |
| Yellow-poplar | 14,330 | 2,386 |
| Other hardwoods | 9,946 | 18,787 |
| Total | 128,600 | 67,800 |
| All species | 132,800 | 70,500 |

Sampling errors for major breakdowns of average net annual growth, removals, and mortality for tables 20 to 26 are given in table 27.

Table 21.—Average net annual growth and removals of growing stock on commercial forest land, by ownership classes, and softwoods and hardwoods, Ohio, 1951-1967

(In thousands of cubic feet)

| Ownership | Average net annual growth | | | Average annual timber removals | | |
|---|---|---|---|---|---|---|
| | All species | Softwoods | Hardwoods | All species | Softwoods | Hardwoods |
| National forest | 3,636 | 309 | 3,327 | 1,067 | 69 | 998 |
| Other public | 8,121 | 412 | 7,709 | 1,821 | 118 | 1,703 |
| Forest industry | 4,187 | 168 | 4,019 | 1,215 | 79 | 1,136 |
| Farmer and misc. private | 116,856 | 3,311 | 113,545 | 66,397 | 2,434 | 63,963 |
| All ownerships | 132,800 | 4,200 | 128,600 | 70,500 | 2,700 | 67,800 |

Table 22.—*Average net annual growth and removals of sawtimber on commercial forest land, by species, Ohio, 1951-1967*

(In thousands of board feet)[1]

| Species | Average net annual growth | Average annual timber removals |
|---|---|---|
| Softwoods: | | |
| Yellow pines | 10,910 | 12,500 |
| White and red pine | 1,648 | — |
| Other softwoods | 1,442 | — |
| Total | 14,000 | 12,500 |
| Hardwoods: | | |
| Select white and red oaks | 107,335 | 47,528 |
| Other white and red oaks | 78,620 | 50,667 |
| Hickory | 41,876 | 7,408 |
| Hard maple | 24,748 | 9,171 |
| Soft maple | 20,748 | 3,889 |
| Beech | 12,870 | 11,350 |
| Ash, walnut, and black cherry | 48,229 | 22,944 |
| Yellow-poplar | 58,972 | 8,573 |
| Other, hardwoods | 14,602 | 35,470 |
| Total | 408,000 | 197,000 |
| All species | 422,000 | 209,500 |

[1] International $\frac{1}{4}$-inch rule.

Table 23.—Average net annual growth and removals of sawtimber on commercial forest land, by ownership classes, and softwoods and hardwoods, Ohio, 1951-1967

(In thousands of board feet)[1]

| Ownership | Average net annual growth | | | Average annual timber removals | | |
|---|---|---|---|---|---|---|
| | All species | Softwoods | Hardwoods | All species | Softwoods | Hardwoods |
| National Forest | 12,795 | 915 | 11,880 | 3,363 | 320 | 3,043 |
| Other public | 26,873 | 1,395 | 25,478 | 5,740 | 547 | 5,193 |
| Forest industry | 14,837 | 753 | 14,084 | 3,829 | 365 | 3,464 |
| Farmer and misc. private | 367,495 | 10,937 | 356,558 | 196,568 | 11,268 | 185,300 |
| All ownerships | 422,000 | 14,000 | 408,000 | 209,500 | 12,500 | 197,000 |

[1] International 1/4-inch rule.

Table 24.—Average annual mortality of growing stock and sawtimber on commercial forest land, by species, Ohio, 1951-1967

| Species | Growing stock | Sawtimber |
|---|---|---|
| | *(thousand cubic feet)* | *(thousand board feet)*[1] |
| Softwoods: | | |
|   Yellow pines | 1,300 | 4,000 |
|   White and red pine | — | — |
|     Total | 1,300 | 4,000 |
| Hardwoods: | | |
|   Select white and red oaks | 2,081 | 4,992 |
|   Other white and red oaks | 3,045 | 6,441 |
|   Hickory | 1,427 | 2,392 |
|   Hard maple | 307 | 972 |
|   Soft maple | 484 | — |
|   Beech | 82 | 406 |
|   Ash, walnut and black cherry | 2,187 | 4,964 |
|   Yellow-poplar | 629 | 1,578 |
|   Other hardwoods | 15,458 | 47,255 |
|     Total | 25,700 | 69,000 |
| All species | 27,000 | 73,000 |

[1] International ¼-inch rule.

Table 25.—*Average annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes, and softwoods and hardwoods, Ohio, 1951-1967*

| Ownership | Growing stock (thousand cubic feet) | | | Sawtimber (thousand board feet)[1] | | |
|---|---|---|---|---|---|---|
| | All species | Softwoods | Hardwoods | All species | Softwoods | Hardwoods |
| National Forest | 550 | 95 | 455 | 1,373 | 252 | 1,121 |
| Other public | 1,616 | 146 | 1,470 | 4,590 | 390 | 4,200 |
| Forest industry | 609 | 52 | 557 | 1,563 | 207 | 1,356 |
| Farmer and misc. private | 24,225 | 1,007 | 23,218 | 65,474 | 3,151 | 62,323 |
| All ownerships | 27,000 | 1,300 | 25,700 | 73,000 | 4,000 | 69,000 |

[1] International 1/4-inch rule.

Table 26.—*Average annual mortality of growing stock and sawtimber on commercial forest land, by causes, and softwoods and hardwoods, Ohio, 1951-1967*

| Cause | Growing stock (thousand cubic feet) | | | Sawtimber (thousand board feet)[1] | | |
|---|---|---|---|---|---|---|
| | All species | Softwoods | Hardwoods | All species | Softwoods | Hardwoods |
| Fire | 557 | — | 557 | 1,860 | — | 1,860 |
| Insects | 303 | — | 303 | 230 | — | 230 |
| Disease | 18,719 | 767 | 17,952 | 54,505 | 2,011 | 52,494 |
| Other | 1,920 | — | 1,920 | 3,385 | — | 3,385 |
| Unknown | 5,501 | 533 | 4,968 | 13,020 | 1,989 | 11,031 |
| All causes | 27,000 | 1,300 | 25,700 | 73,000 | 4,000 | 69,000 |

[1] International 1/4-inch rule.

Table 27.—*Sampling errors, in percent, for major breakdowns of annual growth, removals, and mortality of growing stock and sawtimber, Ohio, 1967*

| Table no. | Breakdown classification | Sampling errors |
|---|---|---|
| | | *Percent* |
| 20 | Growth in cubic feet: | |
| | Softwoods | 39 |
| | Hardwoods | 9 |
| | All species | 9 |
| | Removals in cubic feet: | |
| | Softwoods | (*) |
| | Hardwoods | 14 |
| | All species | 14 |
| 21 | Growth in cubic feet: | |
| | Public | 30 |
| | Forest industry | (*) |
| | Farmer & misc private | 9 |
| | Removals in cubic feet: | |
| | Public | (*) |
| | Forest industry | (*) |
| | Farmer & misc. private | 15 |
| 22 | Growth in board feet: | |
| | Softwoods | 39 |
| | Hardwoods | 9 |
| | All species | 9 |
| | Removals in board feet: | |
| | Softwoods | (**) |
| | Hardwoods | 13 |
| | All species | 13 |

| Table no. | Breakdown classification | Sampling error | |
|---|---|---|---|
| | | *Percent* | |
| 23 | Growth in board feet: | | |
| | Public | 28 | |
| | Forest industry | (*) | |
| | Farmer & misc. private | 10 | |
| | Removals in board feet: | | |
| | Public | (*) | |
| | Forest industry | (*) | |
| | Farmer & misc. private | 14 | |
| 24 | Mortality by species group: | *Cu. ft.* | *Bd. ft.* |
| | Softwoods | (*) | (*) |
| | Hardwoods | 9 | 12 |
| | All species | 9 | 12 |
| 25 | Mortality by owner: | | |
| | Public | 42 | 48 |
| | Forest industry | (*) | (**) |
| | Farmer & misc. pvt. | 10 | 13 |
| 26 | Mortality by cause: | | |
| | Fire | (*) | (*) |
| | Insect | (*) | (**) |
| | Disease | 11 | 15 |
| | Other | 24 | 41 |
| | Unknown | 21 | 31 |

* Sampling errors of 50 to 99 percent.
** Sampling errors of 100 percent and more.

Table 28.—Output of timber products, by source of material and softwoods and hardwoods, Ohio, 1966

| Product and species group | Standard units | Total output | | Roundwood products | | Plant byproducts | |
|---|---|---|---|---|---|---|---|
| | | Number of units | Thousand cubic feet | Number of units | Thousand cubic feet | Number of units | Thousand cubic feet |
| Sawlogs: | | | | | | | |
| Softwood | M board feet[1] | 3,406 | 521 | 3,406 | 521 | — | — |
| Hardwood | M board feet[1] | 386,325 | 59,439 | 386,325 | 59,439 | — | — |
| Total | M board feet[1] | 389,731 | 59,960 | 389,731 | 59,960 | — | — |
| Veneer logs and bolts: | | | | | | | |
| Softwood | M board feet | — | — | — | — | — | — |
| Hardwood | M board feet | 6,712 | 1,032 | 6,712 | 1,032 | — | — |
| Total | M board feet | 6,712 | 1,032 | 6,712 | 1,032 | — | — |
| Pulpwood: | | | | | | | |
| Softwood | Standard cords[2] | 10,400 | 832 | 10,400 | 832 | — | — |
| Hardwood | Standard cords[2] | 365,100 | 29,208 | 326,300 | 26,104 | 38,800 | 3,104 |
| Total | Standard cords[2] | 375,500 | 30,040 | 336,700 | 26,936 | 38,800 | 3,104 |
| Cooperage: | | | | | | | |
| Softwood | M board feet | — | — | — | — | — | — |
| Hardwood | M board feet | 11,041 | 1,697 | 11,041 | 1,697 | — | — |
| Total | M board feet | 11,041 | 1,697 | 11,041 | 1,697 | — | — |
| Piling: | | | | | | | |
| Softwood | M linear feet | — | — | — | — | — | — |
| Hardwood | M linear feet | — | — | — | — | — | — |
| Total | M linear feet | — | — | — | — | — | — |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Poles:** | | | | | | | |
| Softwood | M pieces | 5 | 12 | 5 | 12 | — | — |
| Hardwood | M pieces | — | — | — | — | — | — |
| Total | M pieces | 5 | 12 | 5 | 12 | — | — |
| **Mine timbers (round):** | | | | | | | |
| Softwood | M cubic feet | 203 | 203 | 203 | 203 | — | — |
| Hardwood | M cubic feet | 807 | 807 | 807 | 807 | — | — |
| Total | M cubic feet | 1,010 | 1,010 | 1,010 | 1,010 | — | — |
| **Posts (round and split):** | | | | | | | |
| Softwood | M pieces | 190 | 146 | 190 | 146 | — | — |
| Hardwood | M pieces | 1,250 | 720 | 1,250 | 720 | — | — |
| Total | M pieces | 1,440 | 866 | 1,440 | 866 | — | — |
| **Other:[3]** | | | | | | | |
| Softwood | M cubic feet | 13 | 13 | — | — | 13 | 13 |
| Hardwood | M cubic feet | 10,833 | 10,833 | 5,068 | 5,068 | 5,765 | 5,765 |
| Total | M cubic feet | 10,846 | 10,846 | 5,068 | 5,068 | 5,778 | 5,778 |
| **Total industrial products:** | | | | | | | |
| Softwood | — | — | 1,727 | — | 1,714 | — | 13 |
| Hardwood | — | — | 103,736 | — | 94,867 | — | 8,869 |
| Total | — | — | 105,463 | — | 96,581 | — | 8,882 |
| **Fuelwood:** | | | | | | | |
| Softwood | Standard cords | 650 | 52 | — | — | 650 | 52 |
| Hardwood | Standard cords | 173,425 | 13,874 | 103,000 | 8,240 | 70,425 | 5,634 |
| Total | Standard cords | 174,075 | 13,926 | 103,000 | 8,240 | 71,075 | 5,686 |

Table 28.—Continued

| Product and special group | Total output | | | Roundwood products | | Plant byproducts | |
| | Standard units | Number of units | Thousand cubic feet | Number of units | Thousand cubic feet | Number of units | Thousand cubic feet |
| --- | --- | --- | --- | --- | --- | --- | --- |
| All products: | | | | | | | |
| Softwood | — | — | 1,779 | — | 1,714 | — | 65 |
| Hardwood | — | — | 117,610 | — | 103,107 | — | 14,503 |
| Total | — | — | 119,389 | — | 104,821 | — | 14,568 |

[1] International 1/4-inch rule.
[2] Rough-wood basis (includes chips converted to equivalent standard cords).
[3] Includes hewn ties, excelsior bolts, shingle bolts, turnery bolts, chemical wood, etc.

**Table 29.—Output of roundwood products by source, and softwoods and hardwoods, Ohio, 1966**

(In thousands of cubic feet)

| Product and species group | All sources | Growing-stock trees[1] | | | Rough and rotten trees[1] | Salvable dead trees[1] | Other sources[2] |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Total | Sawtimber | Poletimber | | | |
| Industrial products: | | | | | | | |
| Sawlogs: | | | | | | | |
| Softwood | 521 | 521 | 521 | — | — | — | — |
| Hardwood | 59,439 | 55,424 | 55,252 | 172 | 602 | 1,209 | 2,204 |
| Total | 59,960 | 55,945 | 55,773 | 172 | 602 | 1,209 | 2,204 |
| Veneer logs and bolts: | | | | | | | |
| Softwood | — | — | — | — | — | — | — |
| Hardwood | 1,032 | 990 | 990 | — | 42 | — | — |
| Total | 1,032 | 990 | 990 | — | 42 | — | — |
| Pulpwood: | | | | | | | |
| Softwood | 832 | 713 | 238 | 475 | 48 | — | 71 |
| Hardwood | 26,104 | 21,665 | 17,019 | 4,646 | 576 | 2,278 | 1,585 |
| Total | 26,936 | 22,378 | 17,257 | 5,121 | 624 | 2,278 | 1,656 |
| Misc. industrial products: | | | | | | | |
| Cooperage: | | | | | | | |
| Softwood | — | — | — | — | — | — | — |
| Hardwood | 1,697 | 1,639 | 1,639 | — | 58 | — | — |
| Total | 1,697 | 1,639 | 1,639 | — | 58 | — | — |

Table 29.—Continued

| Product and species group | All sources | Growing-stock trees[1] | | | Rough and rotten trees[1] | Salvable dead trees[1] | Other sources[2] |
|---|---|---|---|---|---|---|---|
| | | Total | Sawtimber | Poletimber | | | |
| Piling: | | | | | | | |
| Softwood | — | — | — | — | — | — | — |
| Hardwood | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — |
| Poles: | | | | | | | |
| Softwood | 12 | 12 | 4 | 8 | — | — | — |
| Hardwood | — | — | — | — | — | — | — |
| Total | 12 | 12 | 4 | 8 | — | — | — |
| Mine timbers (round): | | | | | | | |
| Softwood | 203 | 147 | 27 | 120 | 22 | — | 34 |
| Hardwood | 807 | 670 | 526 | 144 | 18 | 70 | 49 |
| Total | 1,010 | 817 | 553 | 264 | 40 | 70 | 83 |
| Posts (round and split): | | | | | | | |
| Softwood | 146 | 100 | 30 | 70 | 1 | 7 | 38 |
| Hardwood | 720 | 597 | 469 | 128 | 16 | 63 | 44 |
| Total | 866 | 697 | 499 | 198 | 17 | 70 | 82 |

| Product | Softwood / Hardwood | (col 1) | (col 2) | (col 3) | (col 4) | (col 5) | (col 6) | (col 7) |
|---|---|---|---|---|---|---|---|---|
| **Other:** | Softwood | — | — | — | — | — | — | — |
|  | Hardwood | 308 | 442 | 112 | 902 | 3,304 | 4,206 | 5,068 |
|  | Total | 308 | 442 | 112 | 902 | 3,304 | 4,206 | 5,068 |
| **All misc. industrial products:** | Softwood | 72 | 7 | 23 | 198 | 61 | 259 | 361 |
|  | Hardwood | 401 | 575 | 204 | 1,174 | 5,938 | 7,112 | 8,292 |
|  | Total | 473 | 582 | 227 | 1,372 | 5,999 | 7,371 | 8,653 |
| **All industrial products:** | Softwood | 143 | 7 | 71 | 673 | 820 | 1,493 | 1,714 |
|  | Hardwood | 4,190 | 4,062 | 1,424 | 5,992 | 79,199 | 85,191 | 94,867 |
|  | Total | 4,333 | 4,069 | 1,495 | 6,665 | 80,019 | 86,684 | 96,581 |
| **Fuelwood:** | Softwood | — | — | — | — | — | — | — |
|  | Hardwood | 4,973 | 2,264 | 342 | 331 | 330 | 661 | 8,240 |
|  | Total | 4,973 | 2,264 | 342 | 331 | 330 | 661 | 8,240 |
| **All products:** | Softwood | 143 | 7 | 71 | 673 | 820 | 1,493 | 1,714 |
|  | Hardwood | 9,163 | 6,326 | 1,766 | 6,323 | 79,529 | 85,852 | 103,107 |
|  | Total | 9,306 | 6,333 | 1,837 | 6,996 | 80,349 | 87,345 | 104,821 |

[1] On commercial forest land.

[2] Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas or material from noncommercial forest land or nonforest land such as fence rows or suburban areas.

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**Table 30.—*Timber removals from growing stock on commercial forest land, by items, softwoods and hardwoods, Ohio, 1966***

(In thousands of cubic feet)

| Item | All species | Softwoods | Hardwoods |
|---|---|---|---|
| Roundwood products: | | | |
|     Sawlogs | 55,945 | 521 | 55,424 |
|     Veneer logs and bolts | 990 | — | 990 |
|     Pulpwood | 22,378 | 713 | 21,665 |
|     Cooperage logs and bolts | 1,639 | — | 1,639 |
|     Piling | — | — | — |
|     Poles | 12 | 12 | — |
|     Mine timbers | 817 | 147 | 670 |
|     Posts | 697 | 100 | 597 |
|     Other | 4,206 | — | 4,206 |
|     Fuelwood | 661 | — | 661 |
|       All products | 87,345 | 1,493 | 85,852 |
| Logging residues | 21,406 | 84 | 21,322 |
| Other removals | — | — | — |
| Total removals | 108,751 | 1,577 | 107,174 |

**Table 31.—*Timber removals from live sawtimber on commercial forest land, by items, softwoods and hardwoods, Ohio, 1966***

(In thousands of board feet)[1]

| Item | All species | Softwoods | Hardwoods |
|---|---|---|---|
| Roundwood products: | | | |
|     Sawlogs | 335,654 | 2,674 | 332,980 |
|     Veneer logs and bolts | 5,966 | — | 5,966 |
|     Pulpwood | 86,069 | 1,128 | 84,941 |
|     Cooperage logs and bolts | 10,659 | — | 10,659 |
|     Piling | — | — | — |
|     Poles | 18 | 18 | — |
|     Mine timbers | 2,783 | 158 | 2,625 |
|     Posts | 2,476 | 135 | 2,341 |
|     Other | 16,490 | — | 16,490 |
|     Fuelwood | 1,647 | — | 1,647 |
|       All products | 461,762 | 4,113 | 457,649 |
| Logging residues | 83,464 | 52 | 83,412 |
| Other removals | — | — | — |
| Total removals | 545,226 | 4,165 | 541,061 |

[1] International ¼-inch rule.

Table 32.—*Volume of unused residues at primary manufacturing plants, by industry and type of residue, softwoods and hardwoods, Ohio, 1966*

(In thousands of cubic feet)

| Species group and type of residues | All industries | Lumber | Veneer and plywood | Other |
|---|---|---|---|---|
| Softwoods: | | | | |
| Coarse[1] | 105 | 105 | — | — |
| Fine[2] | 64 | 64 | — | — |
| Total | 169 | 169 | — | — |
| Hardwoods: | | | | |
| Coarse | 6,151 | 5,975 | 16 | 160 |
| Fine | 7,890 | 7,435 | 93 | 362 |
| Total | 14,041 | 13,410 | 109 | 522 |
| All species: | | | | |
| Coarse | 6,256 | 6,080 | 16 | 160 |
| Fine | 7,954 | 7,499 | 93 | 362 |
| Total | 14,210 | 13,579 | 109 | 522 |

[1] Material such as slabs, edgings, and veneer cores.
[2] Material such as sawdust and shavings.

#### Table 33.—Timber growth projections, Ohio, 1968-98

| Item | 1968 (inventory year) | 1978 | 1988 | 1998 |
|---|---|---|---|---|
| Assumption:[1] Growth equals timber removals in 1998 | | | | |
| | GROWING STOCK Million cubic feet | | | |
| All species[2] | | | | |
| Growth | 149 | 199 | 248 | 292 |
| Removals | 109 | 173 | 235 | 292 |
| Inventory | 4,181 | 4,511 | 4,714 | 4,786 |
| | SAWTIMBER Million board feet[3] | | | |
| Growth | 487 | 504 | 503 | 489 |
| Removals | 401 | 598 | 712 | 730 |
| Inventory | 14,552 | 14,392 | 12,866 | 10,564 |
| Assumption: Timber removals will continue on the 1952-68 trend | | | | |
| | GROWING STOCK Million cubic feet | | | |
| All species: | | | | |
| Growth | 149 | 204 | 274 | 359 |
| Removals | 109 | 136 | 172 | 202 |
| Inventory | 4,181 | 4,698 | 5,535 | 6,793 |
| | SAWTIMBER Million board feet | | | |
| Growth | 487 | 525 | 597 | 725 |
| Removals | 401 | 474 | 534 | 554 |
| Inventory | 14,552 | 15,063 | 15,612 | 16,662 |

[1] For a discussion of the assumptions used in these projections see section "Timber Supply Outlook."

[2] Separate projections for softwoods and hardwoods were not made because of the small volume of softwood in Ohio.

[3] International 1/4-inch rule.

Table 34.—Land area of Ohio, by land classes and geographic units, 1968
(In thousands of acres)

| Land class | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| Commercial | 1,541.7 | 1,272.7 | 1,566.9 | 1,020.3 | 927.6 | 6,329.2 |
| Productive-reserved | 5.6 | 8.8 | 20.8 | 25.4 | 15.5 | 76.1 |
| Total forest land | 1,547.3 | 1,281.5 | 1,587.7 | 1,045.7 | 943.1 | 6,405.3 |
| Nonforest land | 1,760.4 | 792.7 | 1,830.0 | 4,073.5 | 11,389.4 | 19,846.0 |
| All land | 3,307.7 | 2,074.2 | 3,417.7 | 5,119.2 | 12,332.5 | 26,251.3 |
| *(Sampling errors, in percent)* | | | | | | |
| Commercial forest land | 2 | 2 | 3 | 6 | 6 | 2 |

Table 35.—Areas of commercial forest land in Ohio, by ownership classes and geographic units, 1968

(In thousands of acres)

| Ownership class | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| National Forest | 49.0 | 59.0 | 4.3 | — | — | 112.3 |
| Other federal | — | — | — | 8.2 | 0.5 | 8.7 |
| State | 113.9 | 45.5 | 32.2 | 20.6 | 10.5 | 222.7 |
| County and municipal | — | — | — | 4.0 | — | 4.0 |
| Total public | 162.9 | 104.5 | 36.5 | 32.8 | 11.0 | 347.7 |
| Pulp and paper industry | 60.7 | 37.6 | — | — | — | 98.3 |
| Lumber industry | 5.7 | 3.7 | 8.2 | — | — | 17.6 |
| Other forest industry | 3.4 | 3.6 | 3.9 | — | — | 10.9 |
| Total forest industry | 69.8 | 44.9 | 12.1 | — | — | 126.8 |
| Farmer-owned | 570.5 | 514.9 | 587.6 | 429.1 | 585.8 | 2,687.9 |
| Miscellaneous private | 738.5 | 608.4 | 930.7 | 558.4 | 330.8 | 3,166.8 |
| All ownerships | 1,541.7 | 1,272.7 | 1,566.9 | 1,020.3 | 927.6 | 6,329.2 |
| | (Sampling errors, in percent)[1] | | | | | |
| Forest industry | 20 | 27 | * | — | — | 16 |
| Farmer-owned | 6 | 7 | 7 | 14 | 10 | 4 |
| Miscellaneous private | 5 | 6 | 5 | 11 | 16 | 3 |

[1] No sampling errors for area in public ownership. Areas were obtained from records.
* Sampling error 50 to 99 percent.

**Table 36.—Area of commercial forest land in Ohio, by stand-size classes and geographic units, 1968**

(In thousands of acres)

| Geographic unit | Stand-size class | | | | All classes |
| | Sawtimber stands | Poletimber stands | Sapling and seedling stands | Nonstocked areas | |
|---|---|---|---|---|---|
| South-central | 494.7 | 225.3 | 798.9 | 22.8 | 1,541.7 |
| Southeastern | 397.2 | 153.6 | 680.7 | 41.2 | 1,272.7 |
| East-central | 367.3 | 179.5 | 966.8 | 53.3 | 1,566.9 |
| Northeastern | 339.4 | 99.1 | 535.8 | 46.0 | 1,020.3 |
| Western | 349.5 | 32.6 | 535.1 | 10.4 | 927.6 |
| All units | 1,948.1 | 690.1 | 3,517.3 | 173.7 | 6,329.2 |
| | *(Sampling errors, in percent)* | | | | |
| South-central | 6 | 11 | 5 | 37 | 2 |
| Southeastern | 7 | 14 | 5 | 29 | 2 |
| East-central | 8 | 14 | 5 | 32 | 4 |
| Northeastern | 15 | 32 | 11 | 49 | 6 |
| Western | 14 | (*) | 10 | (**) | 7 |

\* Sampling error between 50 and 99 percent.
\*\* Sampling error 100 percent or more.

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Table 37.—*Area of commercial forest land in Ohio, by stocking classes of growing-stock trees and geographic units, 1968*

(In thousands of acres)

| Geographic unit | Stocking-percentage class | | | | All classes |
| | Over 70 percent | 40 to 70 percent | 10 to 40 percent | Under 10 percent | |
|---|---|---|---|---|---|
| South-central | 1,003.5 | 411.4 | 120.0 | 6.8 | 1,541.7 |
| Southeastern | 787.8 | 334.2 | 133.9 | 16.8 | 1,272.7 |
| East-central | 740.1 | 574.4 | 231.9 | 20.5 | 1,566.9 |
| Northeastern | 553.5 | 307.2 | 125.5 | 34.1 | 1,020.3 |
| Western | 500.4 | 324.2 | 92.5 | 10.5 | 927.6 |
| All units | 3,585.3 | 1,951.4 | 703.8 | 88.7 | 6,329.2 |

Table 38.—*Area of commercial forest land in Ohio, by area-condition classes and geographic units, 1968*

(In thousands of acres)

| Area-condition class[1] | Geographic unit | | | | | All units |
| | South-central | South-eastern | East-central | North-eastern | Western | |
|---|---|---|---|---|---|---|
| Class 10 | — | — | 4.2 | — | — | 4.2 |
| Class 20 | — | — | — | — | — | — |
| Class 30 | — | — | — | — | — | — |
| Class 40 | 6.4 | 3.9 | .1 | — | — | 10.4 |
| Class 50 | 301.1 | 248.1 | 140.3 | 132.5 | 94.9 | 916.9 |
| Class 60 | 857.0 | 633.5 | 689.7 | 446.8 | 510.9 | 3,137.9 |
| Class 70 | 377.2 | 387.2 | 732.6 | 441.0 | 321.8 | 2,259.8 |
| All classes | 1,541.7 | 1,272.7 | 1,566.9 | 1,020.3 | 927.6 | 6,329.2 |

[1] Area-condition classes are briefly described as follows:

Class 10—Areas 100 percent or more stocked with desirable trees and not overstocked.

Class 20—Areas 100 percent or more stocked with desirable trees and overstocked.

Class 30—Areas 60 to 100 percent stocked with desirable trees, and with less than 30 percent of the area controlled by growing-stock trees, cull trees, inhibiting vegetation, or non-stockable conditions.

Class 40—Areas 60 to 100 percent stocked with desirable trees, and with more than 30 percent of the area controlled by other trees and/or conditions that prevent occupancy by desirable trees.

Class 50—Areas less than 60 percent stocked with desirable trees, but with 100 percent or more stocking with growing-stock trees.

Class 60—Areas less than 60 percent stocked with desirable trees, but with 60 to 100 percent stocking with growing-stock trees.

Class 70—Areas less than 60 percent stocked with desirable trees, and with less than 60 percent stocking with growing-stock trees.

**Table 39.—Area of commercial forest land in Ohio, by forest types and geographic units, 1968**

(In thousands of acres)

| Forest type | Geographic unit | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| White-red pine-hemlock | 8.7 | 6.1 | 29.2 | 10.3 | — | 54.3 |
| Spruce-fir[1] | — | — | 8.3 | 10.9 | — | 19.2 |
| Virginia-pitch pine | 106.2 | 57.0 | 11.7 | 10.7 | 20.4 | 206.0 |
| Oak-pine | 110.1 | 74.7 | 112.9 | 78.7 | 102.3 | 478.7 |
| Oak-hickory | 924.7 | 768.2 | 600.2 | 316.6 | 344.1 | 2,953.8 |
| Oak-gum | 8.5 | 13.2 | 4.3 | — | — | 26.0 |
| Elm-ash-red maple | 196.9 | 149.4 | 457.7 | 304.1 | 267.9 | 1,376.0 |
| Maple-beech-birch | 180.4 | 197.2 | 303.3 | 277.8 | 192.9 | 1,151.6 |
| Aspen-birch | 6.2 | 6.9 | 39.3 | 11.2 | — | 63.6 |
| All types | 1,541.7 | 1,272.7 | 1,566.9 | 1,020.3 | 927.6 | 6,329.2 |
| | *(Sampling errors, in percent)* | | | | | |
| White-red pine-hemlock | (*) | (*) | 37 | (**) | — | 30 |
| Spruce-fir | — | — | (*) | (**) | — | (*) |
| Virginia-pitch pine | 17 | 26 | (*) | (**) | (*) | 14 |
| Oak-pine | 17 | 23 | 21 | 36 | 30 | 12 |
| Oak-hickory | 4 | 5 | 7 | 17 | 15 | 3 |
| Oak-gum | (*) | (*) | (**) | — | — | 42 |
| Elm-ash-red maple | 12 | 16 | 8 | 17 | 17 | 6 |
| Maple-beech-birch | 14 | 13 | 10 | 18 | 20 | 7 |
| Aspen-birch | (*) | (*) | 31 | (**) | — | 27 |

* Sampling error 50 to 99 percent.
** Sampling error 100 percent or more.
[1] In Ohio this type is composed entirely of spruce plantations.

Table 40.—*Number of growing-stock trees and cull trees on commercial forest land in Ohio, by diameter-class groups, softwoods and hardwoods, and geographic units, 1968*

(In thousands of trees)

| Diameter-class group (inches) | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| **GROWING-STOCK TREES** | | | | | | |
| Softwoods: | | | | | | |
| 5.0- 8.9 | 5,705 | 4,450 | 3,431 | 489 | 572 | 14,647 |
| 9.0-18.9 | 2,285 | 950 | 782 | 199 | — | 4,216 |
| 19.0 and larger | 6 | 1 | 15 | — | — | 22 |
| Total | 7,996 | 5,401 | 4,228 | 688 | 572 | 18,885 |
| Hardwoods: | | | | | | |
| 5.0-10.9 | 89,092 | 63,425 | 62,521 | 54,780 | 35,720 | 305,538 |
| 11.0-18.9 | 26,898 | 20,175 | 15,040 | 13,702 | 12,411 | 88,226 |
| 19.0 and larger | 2,160 | 1,903 | 1,752 | 1,738 | 2,746 | 10,299 |
| Total | 118,150 | 85,503 | 79,313 | 70,220 | 50,877 | 404,063 |
| All species | 126,146 | 90,904 | 83,541 | 70,908 | 51,449 | 422,948 |
| **CULL TREES** | | | | | | |
| Softwoods: | | | | | | |
| 5.0- 8.9 | 1,042 | 362 | 438 | 155 | 639 | 2,636 |
| 9.0-18.9 | 128 | 87 | 62 | — | 184 | 461 |
| 19.0 and larger | — | — | — | — | — | — |
| Total | 1,170 | 449 | 500 | 155 | 823 | 3,097 |
| Hardwoods: | | | | | | |
| 5.0-10.9 | 32,132 | 20,782 | 25,922 | 22,949 | 15,029 | 116,814 |
| 11.0-18.9 | 4,813 | 3,403 | 5,150 | 3,772 | 4,253 | 21,391 |
| 19.0 and larger | 869 | 1,005 | 1,052 | 1,282 | 1,889 | 6,097 |
| Total | 37,814 | 25,190 | 32,124 | 28,003 | 21,171 | 144,302 |
| All species | 38,984 | 25,639 | 32,624 | 28,158 | 21,994 | 147,399 |

Table 41.—Volume of timber on commercial forest land in Ohio, by class of timber and geographic units, 1968

(In millions of cubic feet)

| Class of timber | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| Sawtimber trees: | | | | | | |
| Sawlogs | 584.5 | 445.3 | 438.0 | 322.2 | 398.4 | 2,188.4 |
| Upper stems | 134.1 | 103.2 | 100.9 | 73.3 | 83.7 | 495.2 |
| Total | 718.6 | 548.5 | 538.9 | 395.5 | 482.1 | 2,683.6 |
| Poletimber trees | 433.8 | 300.7 | 346.3 | 241.4 | 175.1 | 1,497.3 |
| All growing-stock trees | 1,152.4 | 849.2 | 885.2 | 636.9 | 657.2 | 4,180.9 |
| Rough trees | 88.9 | 54.3 | 91.9 | 73.7 | 82.8 | 391.6 |
| Rotten trees | 59.8 | 52.2 | 48.3 | 51.2 | 72.2 | 283.7 |
| Total, all timber | 1,301.1 | 955.7 | 1,025.4 | 761.8 | 812.2 | 4,856.2 |
| *(Sampling errors, in percent)* | | | | | | |
| Sawtimber trees | 3 | 3 | 3 | 8 | 7 | 2 |
| Poletimber trees | 3 | 4 | 4 | 10 | 13 | 3 |
| All growing stock | 2 | 2 | 3 | 6 | 6 | 2 |
| Rough trees | 7 | 8 | 9 | 13 | 15 | 5 |
| Rotten trees | 6 | 8 | 9 | 16 | 14 | 5 |

Table 42.—Volume of growing stock on commercial forest land in Ohio, by ownership classes, softwoods and hardwoods, and geographic units, 1968

(In millions of cubic feet)

| Ownership class and species group | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| **National Forest:** | | | | | | |
| Softwoods | 3.6 | 4.2 | 0.3 | — | — | 8.1 |
| Hardwoods | 40.5 | 48.8 | 3.5 | — | — | 92.8 |
| Total | 44.1 | 53.0 | 3.8 | — | — | 100.9 |
| **Other public:** | | | | | | |
| Softwoods | 7.0 | 1.0 | 2.8 | — | — | 10.8 |
| Hardwoods | 121.2 | 41.5 | 8.6 | 67.2 | 2.3 | 240.8 |
| Total | 128.2 | 42.5 | 11.4 | 67.2 | 2.3 | 251.6 |
| **Forest industry:** | | | | | | |
| Softwoods | 1.3 | 3.1 | — | — | — | 4.4 |
| Hardwoods | 61.3 | 44.2 | 6.6 | — | — | 112.1 |
| Total | 62.6 | 47.3 | 6.6 | — | — | 116.5 |
| **Other private:** | | | | | | |
| Softwoods | 42.2 | 19.3 | 25.3 | 4.5 | 1.3 | 92.6 |
| Hardwoods | 875.3 | 687.1 | 838.1 | 565.2 | 653.6 | 3,619.3 |
| Total | 917.5 | 706.4 | 863.4 | 569.7 | 654.9 | 3,711.9 |
| **All ownerships:** | | | | | | |
| Softwoods | 54.1 | 27.6 | 28.4 | 4.5 | 1.3 | 115.9 |
| Hardwoods | 1,098.3 | 821.6 | 856.8 | 632.4 | 655.9 | 4,065.0 |
| Total | 1,152.4 | 849.2 | 885.2 | 636.9 | 657.2 | 4,180.9 |
| *(Sampling errors, in percent)* | | | | | | |
| National Forest | 9 | 9 | 9 | — | — | 9 |
| Other public | 16 | 22 | 44 | (*) | (*) | 28 |
| Forest industry | 23 | 28 | (*) | — | — | 18 |
| Other private | 4 | 4 | 3 | 7 | 6 | 2 |

* Sampling error 50 to 99 percent.

**Table 43.—Volume of sawtimber on commercial forest land in Ohio, by ownership classes, softwoods and hardwoods, and geographic units, 1968**

(In millions of board feet)[1]

| Ownership class and species group | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| **National Forest:** | | | | | | |
| Softwoods | 9.7 | 11.6 | 0.8 | — | — | 22.1 |
| Hardwoods | 150.2 | 180.6 | 13.1 | — | — | 343.9 |
| Total | 159.9 | 192.2 | 13.9 | — | — | 366.0 |
| **Other public** | | | | | | |
| Softwoods | 29.5 | 3.2 | 1.0 | — | — | 33.7 |
| Hardwoods | 412.8 | 158.4 | 23.8 | 287.6 | — | 882.6 |
| Total | 442.3 | 161.6 | 24.8 | 287.6 | — | 916.3 |
| **Forest industry:** | | | | | | |
| Softwoods | 4.4 | 13.8 | — | — | — | 18.2 |
| Hardwoods | 233.7 | 150.5 | 23.5 | — | — | 407.7 |
| Total | 238.1 | 164.3 | 23.5 | — | — | 425.9 |
| **Other private:** | | | | | | |
| Softwoods | 145.0 | 51.2 | 68.0 | 11.3 | — | 275.5 |
| Hardwoods | 2,828.6 | 2,383.6 | 2,902.9 | 1,884.6 | 2,568.2 | 12,567.9 |
| Total | 2,973.6 | 2,434.8 | 2,970.9 | 1,895.9 | 2,568.2 | 12,843.4 |
| **All ownerships:** | | | | | | |
| Softwoods | 188.6 | 79.8 | 69.8 | 11.3 | — | 349.5 |
| Hardwoods | 3,625.3 | 2,873.1 | 2,963.3 | 2,172.2 | 2,568.2 | 14,202.1 |
| Total | 3,813.9 | 2,952.9 | 3,033.1 | 2,183.5 | 2,568.2 | 14,551.6 |
| *(Sampling errors, in percent)* | | | | | | |
| National Forest | 11 | 11 | 11 | — | — | 11 |
| Other public | 17 | 23 | (*) | (*) | — | 31 |
| Forest industry | 26 | 30 | (*) | — | — | 19 |
| Other private | 3 | 5 | 3 | 8 | 7 | 2 |

* Sampling error 50 to 99 percent.
[1] International ¼-inch rule.

**Table 44.—Volume of growing stock on commercial forest land in Ohio, by stand-size classes, softwoods and hardwoods, and geographic units, 1968**

(In millions of cubic feet)

| Stand-size class and species group | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| **Sawtimber stands:** | | | | | | |
| Softwoods | 19.9 | 7.3 | 12.7 | 0.5 | — | 40.4 |
| Hardwoods | 609.5 | 477.6 | 429.5 | 401.5 | 469.0 | 2,387.1 |
| Total | 629.4 | 484.9 | 442.2 | 402.0 | 469.0 | 2,427.5 |
| **Poletimber stands:** | | | | | | |
| Softwoods | 19.0 | 10.7 | 12.2 | 4.0 | — | 45.9 |
| Hardwoods | 198.6 | 119.4 | 150.9 | 89.7 | 39.0 | 597.6 |
| Total | 217.6 | 130.1 | 163.1 | 93.7 | 39.0 | 643.5 |
| **Other stands:** | | | | | | |
| Softwoods | 15.2 | 9.6 | 3.5 | — | 1.3 | 29.6 |
| Hardwoods | 290.2 | 224.6 | 276.4 | 141.2 | 147.9 | 1,080.3 |
| Total | 305.4 | 234.2 | 279.9 | 141.2 | 149.2 | 1,109.9 |
| **All stands:** | | | | | | |
| Softwoods | 54.1 | 27.6 | 28.4 | 4.5 | 1.3 | 115.9 |
| Hardwoods | 1,098.3 | 821.6 | 856.8 | 632.4 | 655.9 | 4,065.0 |
| Total | 1,152.4 | 849.2 | 885.2 | 636.9 | 657.2 | 4,180.9 |
| *(Sampling errors, in percent)* | | | | | | |
| Sawtimber stands | 5 | 5 | 7 | 11 | 7 | 3 |
| Poletimber stands | 11 | 14 | 13 | 32 | 28 | 8 |
| Other stands | 7 | 8 | 8 | 18 | 13 | 5 |
| **All stands:** | | | | | | |
| Softwoods | 16 | 22 | 40 | (*) | (*) | 14 |
| Hardwoods | 2 | 2 | 3 | 6 | 4 | 2 |
| Total | 2 | 2 | 3 | 6 | 4 | 2 |

* Sampling error 50 to 99 percent.

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**Table 45.—Volume of sawtimber on commercial forest land in Ohio, by stand-size classes, softwoods and hardwoods, and geographic units, 1968**

(In millions of board feet)[1]

| Stand-size class and species group | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| Sawtimber stands: | | | | | | |
| Softwoods | 87.2 | 29.7 | 51.1 | — | — | 168.0 |
| Hardwoods | 2,383.6 | 1,938.1 | 1,789.1 | 1,670.5 | 2,099.8 | 9,881.1 |
| Total | 2,470.8 | 1,967.8 | 1,840.2 | 1,670.5 | 2,099.8 | 10,049.1 |
| Poletimber stands: | | | | | | |
| Softwoods | 51.9 | 25.1 | 4.3 | 11.3 | — | 92.6 |
| Hardwoods | 427.3 | 255.5 | 344.0 | 181.3 | 61.8 | 1,269.9 |
| Total | 479.2 | 280.6 | 348.3 | 192.6 | 61.8 | 1,362.5 |
| Other stands: | | | | | | |
| Softwoods | 49.5 | 25.0 | 14.4 | — | — | 88.9 |
| Hardwoods | 814.4 | 679.5 | 830.2 | 320.4 | 406.6 | 3,051.1 |
| Total | 863.9 | 704.5 | 844.6 | 320.4 | 406.6 | 3,140.0 |
| All stands: | | | | | | |
| Softwoods | 188.6 | 79.8 | 69.8 | 11.3 | — | 349.5 |
| Hardwoods | 3,625.3 | 2,873.1 | 2,963.3 | 2,172.2 | 2,568.2 | 14,202.1 |
| Total | 3,813.9 | 2,952.9 | 3,033.1 | 2,183.5 | 2,568.2 | 14,551.6 |
| *(Sampling errors, in percent)* | | | | | | |
| Sawtimber stands | 5 | 5 | 6 | 10 | 8 | 3 |
| Poletimber stands | 13 | 16 | 16 | 40 | (*) | 9 |
| Other stands | 9 | 10 | 10 | 25 | 22 | 6 |
| All stands: | | | | | | |
| Softwoods | 17 | 23 | (*) | (**) | — | 15 |
| Hardwoods | 3 | 3 | 3 | 7 | 7 | 2 |
| Total | 3 | 3 | 3 | 7 | 7 | 1 |

[1] International $\frac{1}{4}$-inch rule.
* Sampling error 50 to 99 percent.
** Sampling error 100 percent or more.

Table 46.—Net volume of growing stock on commercial forest land in the SOUTH-CENTRAL UNIT, in Ohio, by species and diameter classes, 1968

(In millions of cubic feet)

| Species | All classes | Diameter class (inches at breast height) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 1.1 | 0.9 | 0.2 | — | — | — | — | — | — | — | — |
| Virginia pine | 35.4 | 3.9 | 10.0 | 9.2 | 7.2 | 4.1 | 0.5 | 0.5 | — | — | — |
| Other yellow pines | 14.9 | 1.2 | 2.9 | 3.9 | 1.8 | 1.9 | 1.8 | 1.1 | 0.2 | 0.1 | — |
| Other softwoods | 2.7 | .5 | .8 | .5 | — | .4 | — | .2 | — | — | 0.3 |
| Total softwoods | 54.1 | 6.5 | 13.9 | 13.6 | 9.0 | 6.4 | 2.3 | 1.8 | .2 | .1 | .3 |
| Select white oaks | 192.3 | 11.0 | 18.0 | 30.2 | 34.9 | 29.2 | 27.7 | 15.6 | 8.6 | 15.0 | 2.1 |
| Select red oaks | 72.0 | 2.6 | 5.9 | 8.2 | 11.5 | 11.1 | 10.4 | 6.3 | 5.3 | 9.8 | .9 |
| Chestnut oak[1] | 151.2 | 9.3 | 18.6 | 28.1 | 26.2 | 26.3 | 17.5 | 11.7 | 7.1 | 5.7 | .7 |
| Other red oaks | 152.0 | 3.7 | 13.4 | 23.6 | 23.8 | 27.0 | 21.0 | 19.8 | 8.6 | 10.8 | .3 |
| Hickory species | 135.5 | 12.6 | 24.8 | 29.3 | 27.9 | 19.2 | 10.4 | 5.9 | 2.8 | 2.6 | — |
| Hard maple | 51.7 | 7.8 | 10.8 | 8.9 | 7.4 | 5.3 | 5.3 | 2.2 | 2.4 | 1.3 | .3 |
| Soft maple | 28.6 | 4.9 | 5.2 | 4.4 | 4.8 | 4.7 | 1.6 | .4 | .5 | 1.5 | .6 |
| Beech | 15.8 | .8 | .8 | 1.1 | 2.0 | 2.2 | 1.8 | 1.2 | 2.7 | 2.3 | .9 |
| Ash species | 57.1 | 5.3 | 6.7 | 10.6 | 10.7 | 9.6 | 6.3 | 3.4 | 1.8 | 2.7 | — |
| Aspen and cottonwood | 5.9 | .8 | 1.6 | .8 | 1.0 | .4 | — | — | .3 | 1.0 | — |
| Basswood | 6.5 | .3 | .4 | 1.3 | 1.1 | 1.3 | .8 | .7 | .2 | .4 | — |
| Yellow-poplar | 74.7 | 3.8 | 7.3 | 9.9 | 11.8 | 11.1 | 11.8 | 9.3 | 3.6 | 5.1 | 1.0 |
| Black walnut | 22.6 | 1.9 | 4.5 | 4.2 | 3.7 | 2.9 | 2.3 | 1.2 | .9 | 1.0 | — |
| Black cherry | 13.4 | .6 | 2.2 | 3.7 | 1.7 | 3.1 | 1.3 | .1 | .2 | .5 | — |
| Sycamore | 24.9 | 1.8 | 1.5 | 2.7 | 3.2 | 3.6 | 2.6 | 2.8 | 1.2 | 3.7 | 1.8 |
| Black locust | 11.3 | 3.1 | 2.7 | 3.8 | .7 | .4 | .2 | .2 | .2 | — | — |
| Elm | 27.1 | 4.3 | 4.9 | 6.5 | 2.9 | 4.7 | 2.3 | 1.0 | — | .5 | — |
| Sassafras | 15.9 | 5.1 | 6.2 | 2.1 | 1.7 | .8 | — | — | — | — | — |
| Other hardwoods | 39.8 | 4.6 | 7.0 | 7.2 | 4.7 | 6.1 | 5.2 | 3.6 | .7 | .7 | — |
| Total hardwoods | 1,098.3 | 84.3 | 142.5 | 186.6 | 181.7 | 169.0 | 128.5 | 85.4 | 47.1 | 64.6 | 8.6 |
| All species | 1,152.4 | 90.8 | 156.4 | 200.2 | 190.7 | 175.4 | 130.8 | 87.2 | 47.3 | 64.7 | 8.9 |

[1] Includes a small volume of other white oaks.

by species and diameter classes, 1968

(In millions of cubic feet)

| Species | All classes | Diameter class (inches at breast height) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 6.3 | 2.7 | 1.7 | 0.5 | 0.5 | 0.6 | 0.3 | — | — | — | — |
| Virginia pine | 14.7 | 1.9 | 3.8 | 3.9 | 3.2 | 1.4 | — | 0.5 | — | — | — |
| Other yellow pines | 4.9 | .5 | 1.2 | .3 | 1.7 | .7 | — | .4 | — | 0.1 | — |
| Other softwoods | 1.7 | 1.2 | .3 | — | — | .2 | — | — | — | — | — |
| Total softwoods | 27.6 | 6.3 | 7.0 | 4.7 | 5.4 | 2.9 | 0.3 | 0.9 | — | 0.1 | — |
| Select white oaks | 154.1 | 6.9 | 12.0 | 25.3 | 30.0 | 30.8 | 17.5 | 15.1 | 4.6 | 7.7 | 4.2 |
| Select red oaks | 65.4 | 1.9 | 3.8 | 9.1 | 8.5 | 7.5 | 8.6 | 7.5 | 6.4 | 10.6 | 1.5 |
| Chestnut oak[1] | 72.8 | 4.2 | 10.2 | 11.3 | 16.8 | 9.9 | 9.1 | 3.0 | 3.1 | 5.2 | — |
| Other red oaks | 120.7 | 3.3 | 7.4 | 13.9 | 18.5 | 17.8 | 16.1 | 18.3 | 8.5 | 14.9 | 2.0 |
| Hickory species | 87.9 | 9.3 | 18.3 | 16.4 | 18.9 | 10.5 | 9.1 | 4.4 | .5 | .5 | .2 |
| Hard maple | 37.2 | 5.0 | 6.2 | 6.6 | 7.3 | 4.0 | 3.0 | 2.3 | 2.0 | .6 | — |
| Soft maple | 20.1 | 3.2 | 4.8 | 4.5 | 2.4 | 2.0 | 1.4 | 1.6 | — | .2 | — |
| Beech | 23.6 | 1.1 | 1.8 | 2.3 | 3.2 | 2.9 | 4.6 | 1.2 | 1.2 | 4.5 | .8 |
| Ash species | 28.6 | 3.9 | 3.6 | 5.0 | 5.9 | 2.3 | 3.8 | 1.8 | 1.5 | .5 | .3 |
| Aspen and cottonwood | 9.6 | 2.6 | 3.0 | 1.2 | 1.1 | 1.4 | — | — | — | .3 | — |
| Basswood | 5.1 | .2 | .6 | .8 | .8 | .6 | .6 | .9 | .6 | — | — |
| Yellow-poplar | 86.4 | 5.5 | 9.8 | 13.3 | 9.6 | 15.3 | 12.7 | 6.0 | 5.9 | 7.4 | .9 |
| Black walnut | 18.8 | 1.7 | 2.9 | 2.6 | 3.1 | 3.3 | 2.5 | 1.1 | 1.3 | .3 | — |
| Black cherry | 10.1 | .6 | 2.1 | 2.0 | 1.6 | 2.2 | 1.0 | .3 | — | .3 | — |
| Sycamore | 17.2 | 1.2 | 1.4 | 1.8 | 1.9 | 1.4 | 2.0 | 1.4 | .7 | 3.5 | 1.9 |
| Black locust | 5.4 | .6 | 1.2 | 1.5 | 1.4 | .7 | — | — | — | — | — |
| Elm | 31.0 | 3.6 | 6.3 | 5.9 | 4.7 | 3.6 | 1.6 | 2.0 | 2.3 | .8 | .2 |
| Sassafras | 4.1 | 1.3 | 1.2 | .5 | .3 | .8 | — | — | — | — | — |
| Other hardwoods | 23.5 | 3.0 | 5.3 | 2.4 | 4.9 | 2.4 | 1.6 | 1.7 | 1.1 | .8 | .3 |
| Total hardwoods | 821.6 | 59.1 | 101.9 | 126.4 | 140.9 | 119.4 | 95.2 | 68.6 | 39.7 | 58.1 | 12.3 |
| All species | 849.2 | 65.4 | 108.9 | 131.1 | 146.3 | 122.3 | 95.5 | 69.5 | 39.7 | 58.2 | 12.3 |

[1] Includes a small volume of other white oaks.

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Table 48.—Net volume of growing stock on commercial forest land in the EAST-CENTRAL UNIT, in Ohio, by species and diameter classes, 1968

(In millions of cubic feet)

| Species | All classes | Diameter class (inches at breast height) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 18.3 | 3.7 | 7.5 | 3.6 | 2.4 | 0.6 | 0.3 | — | — | 0.2 | — |
| Virginia pine | .4 | — | .3 | .1 | — | — | — | — | — | — | — |
| Other yellow pines | 4.0 | 2.6 | 1.1 | .3 | — | — | — | — | — | — | — |
| Other softwoods | 5.7 | .5 | .5 | 2.0 | 1.1 | .3 | .3 | .3 | — | .7 | — |
| Total softwoods | 28.4 | 6.8 | 9.4 | 6.0 | 3.5 | .9 | .6 | .3 | — | .9 | — |
| Select white oaks | 97.9 | 5.3 | 10.5 | 12.2 | 12.4 | 15.0 | 11.8 | 8.9 | 5.8 | 12.1 | 3.9 |
| Select red oaks | 60.0 | 2.7 | 6.5 | 7.9 | 6.9 | 4.1 | 4.3 | 6.2 | 3.6 | 13.6 | 4.2 |
| Chestnut oak[1] | 21.0 | .9 | 1.2 | 3.1 | 3.1 | 1.8 | 3.2 | 2.9 | 1.9 | 2.9 | — |
| Other red oaks | 84.3 | 3.3 | 7.6 | 11.9 | 14.1 | 11.3 | 10.8 | 8.0 | 6.8 | 8.0 | 2.5 |
| Hickory species | 80.7 | 7.3 | 12.5 | 12.0 | 14.7 | 13.2 | 8.6 | 4.6 | 4.3 | 3.5 | — |
| Hard maple | 35.6 | 5.1 | 5.8 | 6.4 | 3.5 | 5.6 | 4.2 | 2.1 | 1.2 | .9 | .8 |
| Soft maple | 42.1 | 6.8 | 7.9 | 6.7 | 7.5 | 6.2 | 3.3 | 1.7 | .8 | 1.2 | — |
| Beech | 37.3 | 1.4 | 2.8 | 2.5 | 3.8 | 4.9 | 4.3 | 3.7 | 5.7 | 6.0 | 2.2 |
| Ash species | 41.4 | 3.6 | 4.1 | 7.3 | 7.8 | 5.5 | 4.4 | 2.6 | 3.2 | 2.7 | .2 |
| Aspen and cottonwood | 20.4 | 5.1 | 5.5 | 2.7 | 3.2 | 3.2 | .5 | .2 | 1.7 | — | — |
| Basswood | 6.0 | .3 | .3 | .4 | .4 | 1.5 | .5 | .4 | 1.7 | .5 | — |
| Yellow-poplar | 88.9 | 6.5 | 10.0 | 11.9 | 15.9 | 13.6 | 12.0 | 6.3 | 3.9 | 8.0 | .8 |
| Black walnut | 27.0 | 4.0 | 4.7 | 5.6 | 6.0 | 1.7 | 3.2 | .8 | .4 | .6 | — |
| Black cherry | 51.9 | 6.8 | 10.9 | 10.4 | 11.7 | 5.9 | 3.4 | 1.0 | 1.3 | .5 | — |
| Sycamore | 9.6 | .1 | 1.0 | .2 | .3 | 1.6 | 1.2 | 2.2 | .6 | 1.3 | 1.1 |
| Black locust | 22.3 | 5.2 | 5.8 | 5.6 | 1.3 | 2.1 | 1.1 | .9 | .3 | — | 1.1 |
| Elm | 101.8 | 11.0 | 16.5 | 20.7 | 15.8 | 13.9 | 9.9 | 3.7 | 3.1 | 5.7 | 1.5 |
| Sassafras | 7.1 | 2.8 | 2.3 | 1.0 | .5 | .3 | .2 | — | — | — | — |
| Other hardwoods | 21.5 | 1.5 | 2.9 | 3.1 | 3.7 | 3.6 | 3.2 | 2.1 | — | 1.4 | — |
| Total hardwoods | 856.8 | 79.7 | 118.8 | 131.6 | 132.6 | 115.0 | 90.1 | 58.3 | 44.6 | 68.9 | 17.2 |
| All species | 885.2 | 86.5 | 128.2 | 137.6 | 136.1 | 115.9 | 90.7 | 58.6 | 44.6 | 69.8 | 17.2 |

[1] Includes a small volume of other white oaks.

Table 49.—Net volume of growing stock on commercial forest land in the NORTHEASTERN UNIT, in Ohio, by species and diameter classes, 1968

(In millions of cubic feet)

| Species | All classes | Diameter class (inches at breast height) | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| Other softwoods | 4.5 | 0.5 | 1.8 | 1.4 | 0.8 | — | — | — | — | — | — |
| Total softwoods | 4.5 | 0.5 | 1.8 | 1.4 | 0.8 | — | — | — | — | — | — |
| Select white oaks | 61.3 | 2.4 | 6.9 | 3.9 | 6.9 | 12.2 | 5.0 | 3.1 | 5.3 | 9.9 | 5.7 |
| Select red oaks | 63.9 | 5.5 | 6.8 | 6.0 | 6.0 | 6.6 | 4.7 | 8.7 | .8 | 12.9 | 5.9 |
| Other red oaks | 51.3 | 1.8 | 6.1 | 6.9 | 5.4 | 3.1 | 2.6 | 4.4 | 1.6 | 12.6 | 6.8 |
| Hickory species | 78.3 | 7.9 | 16.3 | 13.2 | 17.6 | 10.7 | 5.1 | 3.3 | 2.4 | 1.8 | — |
| Hard maple | 47.9 | 5.0 | 6.2 | 4.5 | 7.2 | 7.3 | 5.0 | 3.6 | .7 | 6.6 | 1.8 |
| Soft maple | 73.0 | 8.0 | 11.8 | 12.3 | 4.1 | 11.0 | 5.0 | 7.0 | 5.2 | 7.8 | .8 |
| Beech | 39.8 | 5.2 | 4.2 | 6.3 | 6.1 | 2.0 | 6.0 | 3.2 | 3.0 | 3.8 | — |
| Ash species | 63.8 | 5.8 | 10.0 | 9.3 | 12.9 | 10.6 | 6.7 | 2.5 | 1.6 | 4.4 | — |
| Aspen and cottonwood | 7.4 | 3.3 | 2.8 | 1.3 | — | — | — | — | — | — | — |
| Basswood | 6.4 | — | .6 | 1.4 | 1.4 | 1.5 | 1.5 | — | — | — | — |
| Yellow-poplar | 11.8 | .5 | — | .7 | 2.7 | 4.3 | .8 | .6 | .6 | 1.6 | — |
| Black walnut | 10.0 | 1.8 | .8 | 2.1 | .8 | 1.6 | 2.0 | — | .9 | — | — |
| Black cherry | 32.3 | 4.6 | 7.7 | 7.2 | 3.1 | 4.8 | 2.5 | 1.6 | .8 | — | — |
| Sycamore | 2.2 | — | — | .7 | .6 | — | — | — | — | .9 | — |
| Black locust | 1.7 | .4 | 1.3 | — | — | — | — | — | — | — | — |
| Elm | 73.3 | 6.6 | 7.9 | 8.4 | 12.4 | 8.5 | 12.4 | 6.4 | 1.7 | 2.5 | 6.5 |
| Sassafras | 3.3 | .9 | 1.1 | — | .6 | — | — | .7 | — | — | — |
| Other hardwoods | 4.7 | 1.0 | 1.8 | 1.9 | — | — | — | — | — | — | — |
| Total hardwoods | 632.4 | 60.7 | 92.3 | 86.1 | 87.8 | 84.2 | 59.3 | 45.1 | 24.6 | 64.8 | 27.5 |
| All species | 636.9 | 61.2 | 94.1 | 87.5 | 88.6 | 84.2 | 59.3 | 45.1 | 24.6 | 64.8 | 27.5 |

Table 50.—Net volume of growing stock on commercial forest land in the WESTERN UNIT, in Ohio, by species and diameter classes, 1968

(In millions of cubic feet)

| Species | All classes | Diameter class (inches at breast height) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 0.4 | 0.4 | — | — | — | — | — | — | — | — | — |
| Virginia pine | .5 | .5 | — | — | — | — | — | — | — | — | — |
| Other softwoods | .4 | .4 | — | — | — | — | — | — | — | — | — |
| Total softwoods | 1.3 | 1.3 | — | — | — | — | — | — | — | — | — |
| Select white oaks | 87.4 | 3.4 | 3.8 | 2.7 | 5.9 | 8.5 | 11.2 | 10.6 | 6.9 | 27.3 | 7.1 |
| Select red oaks | 51.6 | 1.2 | 5.9 | 3.3 | 3.4 | 3.8 | 3.7 | 5.3 | 5.5 | 18.6 | .9 |
| Chestnut oak[1] | 7.0 | — | — | .6 | 1.5 | — | 3.3 | .7 | — | .9 | — |
| Other red oaks | 23.9 | .6 | — | — | 1.7 | 2.5 | 5.5 | 1.0 | 5.3 | 6.4 | .9 |
| Hickory species | 100.1 | 13.2 | 20.9 | 16.7 | 7.0 | 9.5 | 11.0 | 9.2 | 7.6 | 5.0 | — |
| Hard maple | 67.5 | 2.4 | 8.1 | 7.1 | 11.6 | 14.2 | 6.9 | 6.3 | 3.2 | 7.7 | — |
| Soft maple | 63.6 | 3.0 | 5.6 | 12.6 | 5.7 | 4.0 | 7.4 | 8.6 | 2.2 | 8.0 | 6.5 |
| Beech | 33.6 | — | 1.2 | .8 | 5.3 | 3.6 | .9 | 5.1 | 4.0 | 11.9 | .8 |
| Ash species | 78.5 | 7.7 | 7.2 | 8.7 | 9.3 | 11.4 | 11.1 | 8.3 | 8.8 | 6.0 | — |
| Aspen and cottonwood | 11.7 | 1.4 | 1.2 | .8 | .7 | .9 | 2.7 | .7 | — | — | 3.3 |
| Basswood | 23.3 | 1.0 | — | 4.5 | 3.9 | 2.4 | 4.1 | 3.2 | — | 1.8 | 2.4 |
| Yellow-poplar | 4.0 | — | .7 | — | — | 1.6 | .8 | — | — | .9 | — |
| Black walnut | 20.4 | 1.9 | 1.7 | 4.1 | 3.3 | 2.1 | 3.9 | 1.8 | .9 | .7 | — |
| Black cherry | 14.4 | 2.7 | 3.3 | — | 3.3 | .9 | 2.6 | .7 | — | .9 | — |
| Sycamore | 24.1 | — | .6 | — | — | .8 | 5.9 | 1.8 | 4.5 | 1.7 | 8.8 |
| Black locust | 4.9 | 1.2 | .6 | — | .6 | .8 | — | 1.7 | — | — | — |
| Elm | 10.7 | 1.3 | 3.5 | 1.4 | .8 | .9 | .9 | 1.9 | — | — | — |
| Other hardwoods | 29.2 | .8 | 3.0 | 1.4 | 4.5 | 3.2 | 2.4 | 5.2 | 3.7 | 2.9 | 2.1 |
| Total hardwoods | 655.9 | 41.8 | 67.3 | 64.7 | 68.5 | 71.1 | 84.3 | 72.1 | 52.6 | 100.7 | 32.8 |
| All species | 657.2 | 43.1 | 67.3 | 64.7 | 68.5 | 71.1 | 84.3 | 72.1 | 52.6 | 100.7 | 32.8 |

[1] Includes a small volume of other white oaks.

Table 51.—Net volume of sawtimber on commercial forest land in the SOUTHCENTRAL UNIT, in Ohio, by species and diameter class, 1968

(In millions of board feet)

**Table 51.—Net volume of sawtimber on commercial forest land in the SOUTH-CENTRAL Unit, in Ohio, by species and diameter class, 1968**[1]

(In millions of board feet)[1]

| Species | All classes | Diameter class (inches at breast height) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | — | — | — | — | — | — | — | — | — |
| Virginia pine | 117.8 | 46.7 | 40.4 | 24.5 | 3.1 | 3.1 | — | — | — |
| Other yellow pines | 61.4 | 19.3 | 10.7 | 11.2 | 11.4 | 6.8 | 1.6 | 0.4 | — |
| Other softwoods | 9.4 | 3.5 | — | 2.6 | — | 1.4 | — | — | 1.9 |
| Total softwoods | 188.6 | 69.5 | 51.1 | 38.3 | 14.5 | 11.3 | 1.6 | 0.4 | 1.9 |
| Select white oaks | 698.8 | — | 182.7 | 155.9 | 146.9 | 79.6 | 45.2 | 77.9 | 10.6 |
| Select red oaks | 294.8 | — | 56.7 | 59.6 | 54.3 | 34.0 | 29.6 | 55.4 | 5.2 |
| Chestnut oak[2] | 485.8 | — | 130.0 | 133.3 | 91.2 | 59.6 | 37.3 | 30.6 | 3.8 |
| Other red oaks | 588.1 | — | 116.0 | 145.4 | 110.6 | 105.2 | 47.9 | 60.9 | 2.1 |
| Hickory species | 337.7 | — | 133.4 | 95.1 | 52.0 | 29.5 | 14.4 | 13.3 | — |
| Hard maple | 143.5 | — | 42.7 | 31.5 | 31.6 | 13.2 | 14.6 | 8.5 | 1.4 |
| Soft maple | 85.5 | — | 28.7 | 28.3 | 9.7 | 2.4 | 2.7 | 9.9 | 3.8 |
| Beech | 85.7 | — | 12.3 | 14.9 | 11.5 | 7.5 | 18.5 | 15.0 | 6.0 |
| Ash species | 170.8 | — | 53.1 | 47.5 | 31.4 | 16.4 | 9.2 | 13.2 | — |
| Aspen and cottonwood | 13.8 | — | 5.2 | 2.1 | — | — | 1.3 | 5.2 | — |
| Basswood | 24.5 | — | 5.7 | 7.4 | 4.4 | 3.7 | 1.0 | 2.3 | — |
| Yellow-poplar | 311.6 | — | 66.2 | 64.9 | 68.6 | 54.4 | 21.5 | 30.5 | 5.5 |
| Black walnut | 62.3 | — | 18.5 | 15.5 | 12.7 | 6.2 | 4.4 | 5.0 | — |
| Black cherry | 35.0 | — | 8.2 | 15.8 | 6.5 | .6 | 1.3 | 2.6 | — |
| Sycamore | 98.4 | — | 17.4 | 19.1 | 13.2 | 14.0 | 6.4 | 19.2 | 9.1 |
| Black locust | 9.3 | — | 3.3 | 2.2 | 1.2 | 1.3 | 1.3 | — | — |
| Elm | 59.0 | — | 15.2 | 24.4 | 11.8 | 5.2 | — | 2.4 | — |
| Sassafras | 13.6 | — | 9.2 | 4.4 | — | — | — | — | — |
| Other hardwoods | 107.1 | — | 23.8 | 31.7 | 26.4 | 18.0 | 3.7 | 3.5 | — |
| Total hardwoods | 3,625.3 | — | 928.3 | 899.0 | 684.0 | 450.8 | 260.3 | 355.4 | 47.5 |
| All species | 3,813.9 | 69.5 | 979.4 | 937.3 | 698.5 | 462.1 | 261.9 | 355.8 | 49.4 |

[1] International 1/4-inch rule.
[2] Includes a small volume of other white oaks.

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Table 52.—Net volume of sawtimber on commercial forest land in the SOUTHEASTERN UNIT, in Ohio, by species and diameter classes, 1968

(In millions of board feet)[1]

| Species | All classes | Diameter class (inches at breast height) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 10.6 | 2.5 | 3.0 | 3.3 | 1.8 | — | — | — | — |
| Virginia pine | 49.3 | 20.0 | 17.2 | 8.4 | — | 3.7 | — | — | — |
| Other yellow pines | 18.5 | 1.0 | 9.6 | 4.7 | .4 | 2.3 | — | 0.5 | — |
| Other softwoods | 1.4 | — | — | 1.4 | — | — | — | — | — |
| Total softwoods | 79.8 | 23.5 | 29.8 | 17.8 | 2.2 | 6.0 | — | 0.5 | — |
| Select white oaks | 579.9 | — | 157.7 | 165.5 | 93.1 | 78.5 | 23.7 | 40.7 | 20.7 |
| Select red oaks | 270.8 | — | 40.7 | 39.2 | 44.6 | 41.1 | 36.3 | 60.1 | 8.8 |
| Chestnut oak[2] | 241.4 | — | 82.5 | 52.3 | 47.5 | 15.7 | 16.3 | 27.1 | — |
| Other red oaks | 508.7 | — | 89.3 | 93.3 | 84.9 | 98.7 | 48.0 | 84.1 | 10.4 |
| Hickory species | 214.1 | — | 89.4 | 51.5 | 46.4 | 21.5 | 2.6 | 2.7 | — |
| Hard maple | 115.0 | — | 42.7 | 24.3 | 17.6 | 13.9 | 12.0 | 3.3 | 1.2 |
| Soft maple | 46.1 | — | 14.2 | 12.0 | 8.2 | 10.0 | .4 | 1.3 | — |
| Beech | 121.3 | — | 22.0 | 19.3 | 30.4 | 7.8 | 7.3 | 29.8 | 4.7 |
| Ash species | 80.7 | — | 29.3 | 11.8 | 19.4 | 8.3 | 7.9 | 2.6 | 1.4 |
| Aspen and cottonwood | 14.4 | — | 5.3 | 7.4 | — | — | — | 1.7 | — |
| Basswood | 19.1 | — | 3.6 | 3.3 | 3.7 | 5.0 | 3.5 | — | — |
| Yellow-poplar | 338.1 | — | 53.3 | 88.4 | 74.9 | 35.6 | 34.8 | 45.2 | 5.9 |
| Black walnut | 68.7 | — | 18.6 | 21.8 | 14.7 | 5.4 | 6.8 | 1.4 | — |
| Black cherry | 28.1 | — | 7.6 | 11.3 | 5.7 | 2.0 | — | 1.5 | — |
| Sycamore | 66.4 | — | 9.6 | 7.6 | 10.8 | 7.0 | 3.8 | 18.1 | 9.5 |
| Black locust | 10.5 | — | 7.0 | 3.5 | — | — | — | — | — |
| Elm | 78.8 | — | 23.8 | 19.5 | 7.9 | 10.2 | 12.0 | 4.2 | 1.2 |
| Sassafras | 5.2 | — | 1.2 | 4.0 | — | — | — | — | — |
| Other hardwoods | 65.8 | — | 24.5 | 12.8 | 8.1 | 8.7 | 5.8 | 4.5 | 1.4 |
| Total hardwoods | 2,873.1 | — | 722.3 | 648.8 | 517.9 | 369.4 | 221.2 | 328.3 | 65.2 |
| All species | 2,952.9 | 23.5 | 752.1 | 666.6 | 520.1 | 375.4 | 221.2 | 328.8 | 65.2 |

[1] International 1/4-inch rule.
[1] Includes a small volume of other white oaks.

Table 53.—Net volume of sawtimber on commercial forest land in the **EAST-CENTRAL UNIT**, in Ohio, by species and diameter classes, 1968

(In millions of board feet)[1]

| Species | All classes | Diameter class (inches at breast height) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| White and red pine | 40.8 | 19.4 | 14.2 | 3.8 | 2.0 | — | — | 1.4 | — |
| Virginia pine | .6 | .3 | .2 | .1 | — | — | — | — | — |
| Other yellow pines | 1.6 | 1.5 | — | — | — | 0.1 | — | — | — |
| Other softwoods | 26.8 | 10.5 | 6.7 | 1.8 | 1.5 | 2.1 | — | 4.2 | — |
| Total softwoods | 69.8 | 31.7 | 21.1 | 5.7 | 3.5 | 2.2 | — | 5.6 | — |
| Select white oaks | 382.7 | — | 69.1 | 84.7 | 63.7 | 48.1 | 32.0 | 65.1 | 20.0 |
| Select red oaks | 238.6 | — | 35.4 | 21.7 | 24.1 | 33.2 | 20.3 | 79.9 | 24.0 |
| Chestnut oak[2] | 84.2 | — | 15.9 | 9.9 | 16.5 | 15.0 | 10.7 | 16.2 | — |
| Other red oaks | 337.0 | — | 72.4 | 61.4 | 59.0 | 44.0 | 38.8 | 47.2 | 14.2 |
| Hickory species | 252.9 | — | 74.5 | 68.1 | 43.9 | 24.1 | 22.9 | 19.4 | — |
| Hard maple | 115.3 | — | 21.8 | 35.3 | 26.7 | 12.9 | 7.8 | 6.0 | 4.8 |
| Soft maple | 130.6 | — | 46.3 | 39.4 | 20.9 | 10.9 | 5.4 | 7.7 | — |
| Beech | 210.5 | — | 24.8 | 34.3 | 30.2 | 25.5 | 39.8 | 40.9 | 15.0 |
| Ash species | 137.7 | — | 41.3 | 28.0 | 22.8 | 13.3 | 17.0 | 14.1 | 1.2 |
| Aspen and cottonwood | 38.2 | — | 16.9 | 17.1 | 2.9 | 1.3 | — | — | — |
| Basswood | 29.1 | — | 2.0 | 8.3 | 3.2 | 2.6 | 9.8 | 3.2 | — |
| Yellow-poplar | 367.8 | — | 93.9 | 83.1 | 72.8 | 38.6 | 24.9 | 49.5 | 5.0 |
| Black walnut | 69.4 | — | 33.3 | 8.9 | 17.8 | 4.5 | 1.9 | 3.0 | — |
| Black cherry | 124.5 | — | 58.7 | 31.1 | 18.4 | 5.5 | 7.8 | 3.0 | — |
| Sycamore | 45.4 | — | 1.6 | 8.8 | 6.7 | 12.4 | 3.0 | 7.2 | 5.7 |
| Black locust | 31.3 | — | 7.1 | 12.1 | 5.9 | 4.6 | 1.6 | — | — |
| Elm | 288.1 | — | 85.4 | 75.1 | 53.0 | 19.2 | 17.1 | 30.6 | 7.7 |
| Sassafras | 5.2 | — | 2.5 | 1.5 | 1.2 | — | — | — | — |
| Other hardwoods | 74.8 | — | 18.9 | 19.3 | 17.5 | 11.2 | — | 7.9 | — |
| Total hardwoods | 2,963.3 | — | 721.8 | 648.1 | 507.2 | 326.9 | 260.8 | 400.9 | 97.6 |
| All species | 3,033.1 | 31.7 | 742.9 | 653.8 | 510.7 | 329.1 | 260.8 | 406.5 | 97.6 |

[1] International 1/4-inch rule.
[2] Includes a small volume of other white oaks.

Table 54.—*Net volume of sawtimber on commercial forest land in the NORTHEASTERN UNIT, in Ohio, by species and diameter classes, 1968*

(In millions of board feet)[1]

| Species | All classes | Diameter class (inches at breast height) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| Other softwoods | 11.3 | 6.9 | 4.4 | — | — | — | — | — | — |
| Total softwoods | 11.3 | 6.9 | 4.4 | — | — | — | — | — | — |
| Select white oaks | 273.5 | — | 39.7 | 73.3 | 29.7 | 18.2 | 30.5 | 53.4 | 28.7 |
| Select red oaks | 231.9 | — | 29.7 | 36.6 | 24.3 | 45.1 | 4.6 | 63.2 | 28.4 |
| Other red oaks | 183.7 | — | 27.5 | 18.0 | 13.6 | 22.7 | 8.4 | 61.6 | 31.9 |
| Hickory species | 201.6 | — | 84.4 | 53.1 | 26.4 | 16.7 | 12.1 | 8.9 | — |
| Hard maple | 174.2 | — | 38.0 | 40.7 | 27.9 | 20.1 | 3.7 | 34.7 | 9.1 |
| Soft maple | 263.5 | — | 25.3 | 70.8 | 31.9 | 45.9 | 34.1 | 50.4 | 5.1 |
| Beech | 160.7 | — | 41.1 | 13.4 | 41.1 | 21.1 | 19.7 | 24.3 | — |
| Ash species | 196.4 | — | 64.8 | 53.9 | 34.4 | 13.1 | 8.3 | 21.9 | — |
| Basswood | 23.0 | — | 7.5 | 7.6 | 7.9 | — | — | — | — |
| Yellow-poplar | 63.3 | — | 15.4 | 26.2 | 4.9 | 3.6 | 4.0 | 9.2 | — |
| Black walnut | 26.6 | — | 3.9 | 8.8 | 9.2 | — | 4.7 | — | — |
| Black cherry | 67.4 | — | 15.5 | 25.5 | 13.7 | 8.4 | 4.3 | — | — |
| Sycamore | 8.5 | — | 3.8 | — | — | — | — | 4.7 | — |
| Elm | 289.9 | — | 72.8 | 50.0 | 73.3 | 37.3 | 9.8 | 13.5 | 33.2 |
| Sassafras | 8.0 | — | 3.9 | — | — | 4.1 | — | — | — |
| Total hardwoods | 2,172.5 | — | 473.3 | 477.9 | 338.3 | 256.3 | 144.2 | 345.8 | 136.4 |
| All species | 2,183.5 | 6.9 | 477.7 | 477.9 | 338.3 | 256.3 | 144.2 | 345.8 | 136.4 |

[1] International ¼-inch rule.

**Table 55.—Net volume of sawtimber on commercial forest land in the WESTERN UNIT, in Ohio, by species and diameter classes, 1968**

(In millions of board feet)[1]

| Species | All classes | Diameter class (inches at breast height) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0 and larger |
| Select white oaks | 424.7 | — | 33.3 | 48.6 | 63.8 | 58.5 | 39.4 | 145.4 | 35.7 |
| Select red oaks | 203.5 | — | 15.9 | 20.8 | 19.1 | 26.7 | 27.1 | 90.0 | 3.9 |
| Chestnut oak[2] | 35.0 | — | 8.2 | — | 18.4 | 3.8 | — | 4.6 | — |
| Other red oaks | 117.5 | — | 8.1 | 13.5 | 28.2 | 5.1 | 27.3 | 31.3 | 4.0 |
| Hickory species | 238.8 | — | 32.3 | 45.2 | 53.2 | 45.2 | 38.2 | 24.7 | — |
| Hard maple | 262.3 | — | 59.0 | 75.4 | 37.3 | 33.2 | 17.5 | 39.9 | — |
| Soft maple | 256.7 | — | 33.4 | 24.0 | 45.4 | 53.5 | 13.8 | 49.3 | 37.3 |
| Beech | 199.2 | — | 34.1 | 24.4 | 5.9 | 32.2 | 25.5 | 72.2 | 4.9 |
| Ash species | 272.1 | — | 44.7 | 56.8 | 56.2 | 41.4 | 44.4 | 28.6 | — |
| Aspen and cottonwood | 42.4 | — | 3.8 | 4.5 | 14.6 | 3.8 | — | — | 15.7 |
| Basswood | 88.0 | — | 19.6 | 12.4 | 21.1 | 16.2 | — | 8.2 | 10.5 |
| Yellow-poplar | 18.3 | — | — | 8.7 | 4.9 | — | — | 4.7 | — |
| Black walnut | 73.0 | — | 18.2 | 12.3 | 24.5 | 9.1 | 4.6 | 4.3 | — |
| Black cherry | 42.7 | — | 16.9 | 4.3 | 13.3 | 3.9 | — | 4.3 | — |
| Sycamore | 123.9 | — | — | 4.4 | 33.2 | 9.9 | 25.2 | 9.1 | 42.1 |
| Black locust | 18.3 | — | 3.9 | 4.3 | — | 10.1 | — | — | — |
| Elm | 24.7 | — | 4.1 | 5.1 | 4.7 | 10.8 | — | — | — |
| Other hardwoods | 127.1 | — | 24.8 | 17.8 | 13.4 | 28.2 | 19.0 | 14.5 | 9.4 |
| Total hardwoods | 2,568.2 | — | 360.3 | 382.5 | 457.2 | 391.6 | 282.0 | 531.1 | 163.5 |
| All species | 2,568.2 | — | 360.3 | 382.5 | 457.2 | 391.6 | 282.0 | 531.1 | 163.5 |

[1] International 1/4-inch rule.
[2] Includes a small volume of other white oaks.

**Table 56.—Net volume of sawtimber on commercial forest land in the SOUTH-CENTRAL UNIT, in Ohio, by species and log quality classes, 1968**

(In millions of board feet)[1]

| Species | All classes | Standard-lumber logs | | | Other logs[2] |
| --- | --- | --- | --- | --- | --- |
| | | Grade 1 | Grade 2 | Grade 3 | |
| White and red pine | — | — | — | — | — |
| Virginia pine | 117.8 | 1.3 | 6.1 | 81.4 | 29.0 |
| Other yellow pines | 61.4 | 1.6 | 10.8 | 33.6 | 15.4 |
| Other softwoods | 9.4 | — | — | — | — |
| Total softwoods | 188.6 | 2.9 | 16.9 | 115.0 | 44.4 |
| Select white oaks | 698.8 | 70.5 | 172.3 | 363.1 | 92.9 |
| Select red oaks | 294.8 | 55.4 | 77.6 | 129.0 | 32.8 |
| Chestnut oak[3] | 485.8 | 60.0 | 115.5 | 233.5 | 76.8 |
| Other red oaks | 588.1 | 84.1 | 105.6 | 304.2 | 94.2 |
| Hickory species | 337.7 | 23.5 | 44.8 | 171.6 | 97.8 |
| Hard maple | 143.5 | 11.3 | 22.7 | 84.3 | 25.2 |
| Soft maple | 85.5 | 3.5 | 8.6 | 48.7 | 24.7 |
| Beech | 85.7 | 1.3 | 7.9 | 51.9 | 24.6 |
| Ash species | 170.8 | 18.9 | 39.0 | 77.4 | 35.5 |
| Aspen and cottonwood | 13.8 | 3.4 | 1.9 | 7.4 | 1.1 |
| Basswood | 24.5 | 1.9 | 7.1 | 12.7 | 2.8 |
| Yellow-poplar | 311.6 | 69.9 | 71.4 | 120.5 | 49.8 |
| Black walnut | 62.3 | 6.0 | 13.8 | 36.9 | 5.6 |
| Black cherry | 35.0 | 3.1 | 4.0 | 19.8 | 8.1 |
| Sycamore | 98.4 | 14.5 | 22.7 | 47.1 | 14.1 |
| Black locust | 9.3 | — | .8 | 6.5 | 2.0 |
| Elm | 59.0 | 3.2 | 12.8 | 35.0 | 8.0 |
| Sassafras | 13.6 | — | 1.5 | 9.9 | 2.2 |
| Other hardwoods | 107.1 | 8.8 | 23.4 | 56.0 | 18.9 |
| Total hardwoods | 3,625.3 | 439.3 | 753.4 | 1,815.5 | 617.1 |

[1] International ¼-inch rule.
[2] For white, red, and yellow pines "Other" is grade 4. For hardwoods "Other" is tie and timber logs. Other softwoods were not graded into standard-lumber grades.
[3] Includes a small volume of other white oaks.

**Table 57.—Net volume of sawtimber on commercial forest land in the SOUTH-
EASTERN UNIT, in Ohio, by species and log quality classes, 1968**

(In millions of board feet)[1]

| Species | All classes | Standard-lumber logs | | | Other logs[2] |
|---|---|---|---|---|---|
| | | Grade 1 | Grade 2 | Grade 3 | |
| White and red pine | 10.6 | — | — | 7.9 | 2.7 |
| Virginia pine | 49.3 | — | 1.2 | 37.1 | 11.0 |
| Other yellow pines | 18.5 | 1.0 | 4.3 | 9.0 | 4.2 |
| Other softwoods | 1.4 | — | — | — | — |
| Total softwoods | 79.8 | 1.0 | 5.5 | 54.0 | 17.9 |
| Select white oaks | 579.9 | 44.7 | 156.1 | 278.6 | 100.5 |
| Select red oaks | 270.8 | 64.9 | 71.8 | 96.3 | 37.8 |
| Chestnut oak[3] | 241.4 | 22.6 | 64.4 | 114.2 | 40.2 |
| Other red oaks | 508.7 | 93.1 | 106.8 | 216.4 | 92.4 |
| Hickory species | 214.1 | 7.9 | 31.5 | 104.4 | 70.3 |
| Hard maple | 115.0 | 9.6 | 16.6 | 63.7 | 25.1 |
| Soft maple | 46.1 | 1.4 | 12.4 | 25.0 | 7.3 |
| Beech | 121.3 | 1.3 | 9.6 | 55.3 | 55.1 |
| Ash species | 80.7 | 9.1 | 20.1 | 34.2 | 17.3 |
| Aspen and cottonwood | 14.4 | — | 2.7 | 8.5 | 3.2 |
| Basswood | 19.1 | 1.2 | 4.6 | 11.0 | 2.3 |
| Yellow-poplar | 338.1 | 81.5 | 82.8 | 122.9 | 50.9 |
| Black walnut | 68.7 | 3.4 | 16.0 | 42.2 | 7.1 |
| Black cherry | 28.1 | 2.7 | 5.2 | 14.2 | 6.0 |
| Sycamore | 66.4 | 14.1 | 20.5 | 23.7 | 8.1 |
| Black locust | 10.5 | — | — | 7.7 | 2.8 |
| Elm | 78.8 | 4.8 | 17.2 | 35.4 | 21.4 |
| Sassafras | 5.2 | — | — | 4.7 | .5 |
| Other hardwoods | 65.8 | 7.8 | 14.0 | 31.7 | 12.3 |
| Total hardwoods | 2,873.1 | 370.1 | 652.3 | 1,290.1 | 560.6 |

[1] International ¼-inch rule.
[2] For white, red, and yellow pines "Other" is grade 4. For hardwoods "Other" is tie and timber logs. Other softwoods were not graded into standard-lumber grades.
[3] Includes a small volume of other white oaks.

Table 58.—*Net volume of sawtimber on commercial forest land in the EAST-CENTRAL UNIT, in Ohio, by species and log quality classes, 1968*

(In millions of board feet)[1]

| Species | All classes | Standard-lumber logs | | | Other logs[2] |
|---|---|---|---|---|---|
| | | Grade 1 | Grade 2 | Grade 3 | |
| White and red pine | 40.8 | — | — | 26.3 | 14.5 |
| Virginia pine | .6 | — | — | .4 | .2 |
| Other yellow pines | 1.6 | — | — | 1.5 | .1 |
| Other softwoods | 26.8 | — | — | — | — |
| Total softwoods | 69.8 | — | — | 28.2 | 14.8 |
| Select white oaks | 382.7 | 46.1 | 95.6 | 187.0 | 54.0 |
| Select red oaks | 238.6 | 51.0 | 53.6 | 104.2 | 29.8 |
| Chestnut oak[3] | 84.2 | 7.7 | 28.4 | 36.4 | 11.7 |
| Other red oaks | 337.0 | 28.3 | 63.9 | 189.1 | 55.7 |
| Hickory species | 252.9 | 18.0 | 38.8 | 98.6 | 97.5 |
| Hard maple | 115.3 | 10.1 | 26.3 | 56.3 | 22.6 |
| Soft maple | 130.6 | 4.7 | 13.3 | 81.0 | 31.6 |
| Beech | 210.5 | 4.7 | 36.7 | 118.5 | 50.6 |
| Ash species | 137.7 | 12.8 | 30.4 | 62.8 | 31.7 |
| Aspen and cottonwood | 38.2 | — | 5.4 | 23.5 | 9.3 |
| Basswood | 29.1 | 2.5 | 10.3 | 14.3 | 2.0 |
| Yellow-poplar | 367.8 | 58.6 | 59.5 | 156.2 | 93.5 |
| Black walnut | 69.4 | 3.4 | 8.3 | 45.2 | 12.5 |
| Black cherry | 124.5 | 3.5 | 5.5 | 72.7 | 42.8 |
| Sycamore | 45.4 | 14.0 | 10.7 | 17.4 | 3.3 |
| Black locust | 31.3 | — | 2.3 | 24.6 | 4.4 |
| Elm | 288.1 | 18.2 | 44.9 | 174.3 | 50.7 |
| Sassafras | 5.2 | .7 | .2 | 3.8 | .5 |
| Other hardwoods | 74.8 | 8.1 | 16.6 | 39.1 | 11.0 |
| Total hardwoods | 2,963.3 | 292.4 | 550.7 | 1,505.0 | 615.2 |

[1] International 1/4-inch rule.
[2] For white, red, and yellow pines "Other" is grade 4. For hardwoods "Other" is tie and timber logs. Other softwoods were not graded into standard-lumber grades.
[3] Includes a small volume of other white oaks.

(In millions of board feet)[1]

| Species | All classes | Standard-lumber logs | | | Other logs[2] |
|---------|-------------|---------|---------|---------|------------|
| | | Grade 1 | Grade 2 | Grade 3 | |
| Other softwoods | 11.3 | — | — | — | — |
| Total softwoods | 11.3 | — | — | — | — |
| Select white oaks | 273.5 | 23.6 | 67.8 | 112.9 | 69.2 |
| Select red oaks | 231.9 | 47.9 | 51.9 | 108.2 | 23.9 |
| Other red oaks | 183.7 | 53.0 | 32.6 | 43.7 | 54.4 |
| Hickory species | 201.6 | 4.8 | 24.9 | 113.9 | 58.0 |
| Hard maple | 174.2 | 16.1 | 31.9 | 99.4 | 26.8 |
| Soft maple | 263.5 | 31.0 | 57.1 | 133.3 | 42.1 |
| Beech | 160.7 | 3.9 | 21.1 | 87.4 | 48.3 |
| Ash species | 196.4 | 13.5 | 43.8 | 91.0 | 48.1 |
| Basswood | 23.0 | 4.0 | 1.8 | 15.4 | 1.8 |
| Yellow-poplar | 63.3 | 6.4 | 11.5 | 32.9 | 12.5 |
| Black walnut | 26.6 | 2.9 | 10.0 | 11.4 | 2.3 |
| Black cherry | 67.4 | 5.2 | 11.9 | 34.9 | 15.4 |
| Sycamore | 8.5 | — | — | 7.7 | .8 |
| Elm | 289.9 | 24.0 | 72.5 | 152.8 | 40.6 |
| Sassafras | 8.0 | — | 2.7 | 4.5 | .8 |
| Total hardwoods | 2,172.2 | 236.3 | 441.5 | 1,049.4 | 445.0 |

[1] International $\frac{1}{4}$-inch rule.
[2] For white, red, and yellow pines "Other" is grade 4. For hardwoods "Other" is tie and timber logs. Other softwoods were not graded into standard-lumber grades.

Table 60.—*Net volume of sawtimber on commercial forest land in the WESTERN UNIT, in Ohio, by species and log quality classes, 1968*

(In millions of board feet)[1]

| Species | All classes | Standard-lumber logs | | | Other logs[2] |
| | | Grade 1 | Grade 2 | Grade 3 | |
|---|---|---|---|---|---|
| Select white oaks | 424.7 | 76.1 | 103.8 | 192.2 | 52.6 |
| Select red oaks | 203.5 | 69.5 | 44.4 | 70.9 | 18.7 |
| Chestnut oak[3] | 35.0 | 6.0 | 13.2 | 12.6 | 3.2 |
| Other red oaks | 117.5 | 14.9 | 10.6 | 39.3 | 52.7 |
| Hickory species | 238.8 | 33.0 | 54.6 | 97.7 | 53.5 |
| Hard maple | 262.3 | 19.5 | 59.1 | 150.8 | 32.9 |
| Soft maple | 256.7 | 7.1 | 70.8 | 126.0 | 52.8 |
| Beech | 199.2 | 13.1 | 48.9 | 102.7 | 34.5 |
| Ash species | 272.1 | 79.7 | 61.1 | 103.0 | 28.3 |
| Aspen and cottonwood | 42.4 | 10.1 | 7.0 | 6.8 | 18.5 |
| Basswood | 88.0 | 5.3 | 16.0 | 60.1 | 6.6 |
| Yellow-poplar | 18.3 | — | 3.2 | 9.0 | 6.1 |
| Black walnut | 73.0 | 13.1 | 14.7 | 39.1 | 6.1 |
| Black cherry | 42.7 | 7.9 | 5.0 | 22.9 | 6.9 |
| Sycamore | 123.9 | 49.5 | 29.9 | 36.2 | 8.3 |
| Black locust | 18.3 | 3.2 | 4.4 | 9.2 | 1.5 |
| Elm | 24.7 | 3.6 | 4.5 | 14.5 | 2.1 |
| Sassafras | — | — | — | — | — |
| Other hardwoods | 127.1 | 22.7 | 24.2 | 65.9 | 14.3 |
| Total hardwoods | 2,568.2 | 434.3 | 575.4 | 1,158.9 | 399.6 |

[1] International ¼-inch rule.

[2] For white, red, and yellow pines "Other" is grade 4. For hardwoods "Other" is tie and timber logs. Other softwoods were not graded into standard-lumber grades.

[3] Includes a small volume of other white oaks.

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**Table 61.—Sampling errors for growing stock on commercial forest land by species and geographic unit in Ohio, 1968**

(In percent)

| Species | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| White and red pine | 46 | (*) | (*) | — | (**) | 38 |
| Virginia pine | 21 | 27 | (**) | — | (**) | 16 |
| Other yellow pines | 29 | 32 | (*) | — | — | 26 |
| Other softwoods | 37 | (*) | (*) | (*) | (**) | 36 |
| Total softwoods | 16 | 22 | 39 | (*) | (*) | 14 |
| Select white oaks | 7 | 7 | 10 | 21 | 22 | 5 |
| Select red oaks | 9 | 9 | 9 | 21 | 22 | 7 |
| Chestnut oak | 10 | 12 | 29 | — | (*) | 8 |
| Other red oaks | 7 | 8 | 11 | 27 | 37 | 6 |
| Hickory | 7 | 8 | 9 | 25 | 17 | 6 |
| Hard maple | 13 | 13 | 14 | 26 | 26 | 10 |
| Soft maple | 16 | 17 | 11 | 18 | 29 | 10 |
| Beech | 21 | 15 | 15 | 31 | 39 | 13 |
| Ash species | 12 | 15 | 13 | 16 | 14 | 7 |
| Aspen and cottonwood | 39 | 22 | 21 | 43 | 46 | 15 |
| Basswood | 28 | 34 | 40 | 36 | 37 | 20 |
| Yellow-poplar | 11 | 12 | 14 | 34 | (*) | 8 |
| Black walnut | 17 | 16 | 16 | 39 | 22 | 9 |
| Black cherry | 22 | 19 | 11 | 23 | 31 | 9 |
| Sycamore | 19 | 24 | 40 | (*) | (*) | 19 |
| Black locust | 18 | 29 | 21 | (*) | 46 | 13 |
| Elm | 13 | 14 | 10 | 18 | 29 | 7 |
| Sassafras | 23 | 33 | 20 | (*) | — | 14 |
| Other hardwoods | 10 | 16 | 15 | 42 | — | 9 |
| Total hardwoods | 2 | 2 | 3 | 6 | 6 | 2 |
| All species | 2 | 2 | 3 | 6 | 6 | 2 |

* Sampling error 50 to 99 percent.
** Sampling error 100 percent or more

**Table 62.—Sampling errors for sawtimber on commercial forest land by species and geographic unit in Ohio, 1968**

(In percent)

| Species | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| White and red pine | — | (*) | (*) | — | — | (*) |
| Virginia pine | 23 | 28 | — | — | — | 18 |
| Other yellow pines | 30 | 38 | (**) | — | — | 21 |
| Other softwoods | (*) | (**) | (*) | (**) | — | 44 |
| Total softwoods | 17 | 23 | (*) | (**) | — | 15 |
| Select white oaks | 8 | 8 | 11 | 22 | 24 | 6 |
| Select red oaks | 10 | 10 | 11 | 23 | 25 | 7 |
| Chestnut oak | 11 | 13 | 35 | — | (*) | 9 |
| Other red oaks | 8 | 9 | 11 | 32 | 38 | 6 |
| Hickory | 10 | 11 | 11 | 31 | 20 | 8 |
| Hard maple | 16 | 15 | 16 | 32 | 30 | 13 |
| Soft maple | 21 | 23 | 15 | 22 | 30 | 13 |
| Beech | 23 | 17 | 16 | 31 | 38 | 14 |
| Ash species | 15 | 17 | 14 | 21 | 17 | 8 |
| Aspen and cottonwood | (*) | 44 | 37 | — | (*) | 28 |
| Basswood | 30 | 39 | 48 | 36 | 40 | 22 |
| Yellow-poplar | 12 | 15 | 15 | 35 | (*) | 9 |
| Black walnut | 20 | 21 | 22 | (*) | 29 | 12 |
| Black cherry | 28 | 23 | 15 | 32 | 39 | 12 |
| Sycamore | 21 | 26 | 46 | (*) | (*) | 22 |
| Black locust | 35 | 36 | 30 | — | (*) | 23 |
| Elm | 17 | 18 | 12 | 20 | (*) | 10 |
| Sassafras | 35 | (*) | (*) | (*) | — | 26 |
| Other hardwoods | 14 | 18 | 16 | — | 31 | 12 |
| Total hardwoods | 3 | 3 | 3 | 7 | 7 | 2 |
| All species | 3 | 3 | 3 | 7 | 7 | 1 |

*Sampling error 50 to 99 percent.
**Sampling error 100 percent or more

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Table 63.—Average annual growth of growing stock on commercial forest land in Ohio, by species and geographic unit, 1951-67

(In thousands of cubic feet)

| Species | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| White and red pine | 42 | 240 | 578 | — | — | 860 |
| Yellow pines | 2,170 | 486 | 228 | — | — | 2,884 |
| Other softwoods[1] | 104 | 65 | 287 | [2] | [2] | 456 |
| Total softwoods | 2,316 | 791 | 1,093 | [2] | [2] | 4,200 |
| Select white and red oaks | 9,916 | 5,360 | 5,517 | 6,180 | 2,523 | 29,496 |
| Other white and red oaks | 10,652 | 5,186 | 3,859 | 3,074 | 405 | 23,176 |
| Hickory | 4,112 | 1,955 | 2,084 | 1,490 | 3,158 | 12,799 |
| Hard maple | 1,670 | 1,725 | 1,609 | 2,155 | 1,418 | 8,577 |
| Soft maple | 1,553 | 882 | 1,688 | 2,419 | 96 | 6,638 |
| Beech | 211 | 405 | 585 | 719 | 371 | 2,291 |
| Ash-walnut-cherry | 3,566 | 1,865 | 6,254 | 4,572 | 5,090 | 21,347 |
| Yellow-poplar | 2,848 | 4,223 | 5,296 | 1,924 | 39 | 14,330 |
| Other hardwoods | 5,345 | 3,384 | 7,804 | -1,535 | -5,052 | 9,946 |
| Total hardwoods | 39,873 | 24,985 | 34,696 | 20,998 | 8,048 | 128,600 |
| All species | 42,189 | 25,776 | 35,789 | 20,998 | 8,048 | 132,800 |
| | (Sampling errors, in percent) | | | | | |
| All softwoods | 46 | (*) | (**) | — | (*) | 39 |
| All hardwoods | 11 | 12 | 21 | 21 | (*) | 9 |
| All species | 11 | 12 | 20 | 21 | (*) | 9 |

[1] May include a small volume of hemlock.
[2] Negligible.
* Sampling errors of 50 to 99 percent.
** Sampling errors of 100 per cent or more

Table 64.—Average annual removals of growing stock on commercial forest land in Ohio, by species and geographic unit, 1951-67

(In thousands of cubic feet)

| Species | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| Yellow pines | 1,637 | 512 | 551 | —[1] | —[1] | 2,700[1] |
| Other softwoods | — | — | — | [1] | [1] | [1] |
| Total softwoods | 1,637 | 512 | 551 | [1] | [1] | 2,700 |
| Select white and red oaks | 3,589 | 2,610 | 1,625 | 2,247 | 3,752 | 13,823 |
| Other white and red oaks | 7,288 | 3,257 | 3,010 | 359 | 1,789 | 15,703 |
| Hickory | 1,340 | 353 | 277 | 48 | 1,183 | 3,201 |
| Hard maple | 72 | 294 | — | 1,637 | 411 | 2,414 |
| Soft maple | 26 | — | 24 | 1,004 | — | 1,054 |
| Beech | 584 | 97 | 678 | 1,466 | — | 2,825 |
| Ash-walnut cherry | 1,130 | 825 | 2,706 | 1,396 | 1,550 | 7,607 |
| Yellow-poplar | 687 | 652 | 328 | 213 | 506 | 2,386 |
| Other hardwoods | 3,869[2] | 1,393[2] | 2,234 | 1,651 | 9,640 | 18,787 |
| Total hardwoods | 18,585 | 9,481 | 10,882 | 10,021 | 18,831 | 67,800 |
| All species | 20,222 | 9,993 | 11,433 | 10,021 | 18,831 | 70,500 |
| | (Sampling errors, in percent) | | | | | |
| All softwoods | (**) | (**) | (**) | — | — | (*) |
| All hardwoods | 26 | 22 | 23 | 26 | 37 | 13 |
| All species | 25 | 22 | 23 | 26 | 27 | 14 |

[1] Negligible.
[2] Includes 49,000 cubic feet of yellow birch.
* Sampling errors of 50 to 99 percent.
** Sampling errors of 100 percent or more.

**Table 65.—Average annual growth of sawtimber on commercial forest land in Ohio by species and geographic unit, 1951-67**

(In thousands of board feet)[1]

| Species | Geographic unit | | | | | |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | All units |
| White and red pine | — | 313 | 1,335 | — | — | 1,648 |
| Yellow pines | 8,553 | 2,286 | 71 | — | — | 10,910 |
| Other softwoods[2] | 370 | 34 | 1,038 | [3] | [3] | 1,442 |
| Total softwoods | 8,923 | 2,633 | 2,444 | [3] | [3] | 14,000 |
| Select white and red oaks | 35,665 | 21,254 | 23,038 | 17,937 | 9,441 | 107,335 |
| Other white and red oaks | 36,604 | 19,976 | 13,282 | 6,021 | 2,737 | 78,620 |
| Hickory | 13,930 | 5,195 | 6,887 | 6,139 | 9,725 | 41,876 |
| Hard maple | 5,634 | 2,959 | 4,142 | 7,487 | 4,526 | 24,748 |
| Soft maple | 4,771 | 2,485 | 4,613 | 8,492 | 387 | 20,748 |
| Beech | 1,144 | 2,372 | 3,044 | 3,959 | 2,351 | 12,870 |
| Ash-walnut-cherry | 9,567 | 6,575 | 12,117 | 11,819 | 8,151 | 48,229 |
| Yellow-poplar | 12,097 | 17,039 | 23,334 | 6,146 | 356 | 58,972 |
| Other hardwoods | 13,244 | 9,259 | 16,637 | −4,366 | −20,172 | 14,602 |
| Total hardwoods | 132,656 | 87,114 | 107,094 | 63,634 | 17,502 | 408,000 |
| All species | 141,579 | 89,747 | 109,538 | 63,634 | 17,502 | 422,000 |
| | *(Sampling errors, in percent)* | | | | | |
| All softwoods | 39 | 39 | 39 | — | (*) | 39 |
| All hardwoods | 13 | 17 | 21 | 21 | (*) | 9 |
| All species | 12 | 17 | 21 | 21 | (*) | 9 |

[1] International ¼-inch rule.
[2] May include a small amount of hemlock.
[3] Negligible.
* Sampling errors of 50 to 99 percent.

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Table 66.—Average annual removals of sawtimber on commercial forest land in Ohio by species and geographic unit, 1951-67

(In thousands of board feet)[1]

| Species | Geographic unit | | | | | All units |
|---|---|---|---|---|---|---|
| | South-central | South-eastern | East-central | North-eastern | Western | |
| Yellow pines | 7,577 | 2,372 | 2,551 | [2] | — | 12,500 |
| Other softwoods | — | — | — | [2] | [2] | [2] |
| Total softwoods | 7,577 | 2,372 | 2,551 | [2] | [2] | 12,500 |
| Select white and red oaks | 8,408 | 9,922 | 7,391 | 8,573 | 13,234 | 47,528 |
| Other white and red oaks | 19,172 | 13,245 | 11,763 | 645 | 5,842 | 50,667 |
| Hickory | 1,622 | 1,381 | 899 | — | 3,506 | 7,408 |
| Hard maple | 287 | 1,153 | — | 6,345 | 1,386 | 9,171 |
| Soft maple | — | — | — | 3,889 | — | 3,889 |
| Beech | 1,971 | 494 | 3,205 | 5,680 | — | 11,350 |
| Ash-walnut-cherry | 3,232 | 3,441 | 6,461 | 4,082 | 5,728 | 22,944 |
| Yellow-poplar | 1,993 | 2,550 | 1,244 | 825 | 1,961 | 8,573 |
| Other hardwoods | 14,968 | — | 3,936 | 4,558 | 12,008 | 35,470 |
| Total hardwoods | 51,653 | 32,186 | 34,899 | 34,597 | 43,665 | 197,000 |
| All species | 59,230 | 34,558 | 37,450 | 34,597 | 43,665 | 209,500 |
| | (Sampling errors, in percent) | | | | | |
| All softwoods | (**) | (**) | (**) | — | — | (**) |
| All hardwoods | 33 | 28 | 26 | 27 | 26 | 13 |
| All species | 33 | 28 | 26 | 27 | 26 | 13 |

[1] International 1/4-inch rule.
[2] Negligible.
* Sampling errors of 50 to 99 percent.
** Sampling errors of 100 percent or more.

**Table 67.—Area of Ohio, by land classes and by geographic units and counties, 1968**

| County | Total land area[1] | Nonforest land area | Forest-land area | | | |
|---|---|---|---|---|---|---|
| | | | Noncommercial[2] | Commercial | | Sampling error[3] |
| | *1,000 acres* | *1,000 acres* | *1,000 acres* | *1,000 acres* | *Percent* | *Percent* |
| SOUTH-CENTRAL UNIT | | | | | | |
| Adams | 375.9 | 188.8 | 0.2 | 186.9 | 50 | 6 |
| Brown | 313.9 | 237.1 | — | 76.8 | 24 | 12 |
| Clermont | 293.3 | 202.3 | .8 | 90.2 | 31 | 9 |
| Gallia | 301.4 | 142.3 | — | 159.1 | 53 | 7 |
| Highland | 351.4 | 267.2 | 2.2 | 82.0 | 23 | 12 |
| Jackson | 267.9 | 126.3 | .3 | 141.3 | 53 | 8 |
| Lawrence | 291.5 | 83.4 | — | 208.1 | 71 | 6 |
| Pike | 283.6 | 114.2 | .9 | 168.5 | 59 | 6 |
| Ross | 439.6 | 269.3 | 1.0 | 169.3 | 39 | 7 |
| Scioto | 389.2 | 129.5 | .2 | 259.5 | 67 | 5 |
| Total | 3,307.7 | 1,760.4 | 5.6 | 1,541.7 | 47 | 2 |
| SOUTHEASTERN UNIT | | | | | | |
| Athens | 322.6 | 104.8 | 2.5 | 215.3 | 67 | 7 |
| Hocking | 269.4 | 71.0 | 1.6 | 196.8 | 73 | 6 |
| Meigs | 278.7 | 110.6 | .6 | 167.5 | 60 | 7 |
| Morgan | 268.5 | 151.2 | 2.4 | 114.9 | 43 | 10 |
| Perry | 262.1 | 129.2 | — | 132.9 | 51 | 10 |
| Vinton | 262.7 | 66.8 | 1.7 | 194.2 | 74 | 6 |
| Washington | 410.2 | 159.1 | — | 251.1 | 61 | 6 |
| Total | 2,074.2 | 792.7 | 8.8 | 1,272.7 | 61 | 2 |
| EAST-CENTRAL UNIT | | | | | | |
| Belmont | 342.0 | 183.7 | 1.6 | 156.7 | 46 | 9 |
| Carroll | 249.9 | 136.1 | .7 | 113.1 | 45 | 11 |
| Coshocton | 359.6 | 211.2 | .2 | 148.2 | 41 | 10 |
| Guernsey | 337.7 | 182.3 | 13.2 | 142.2 | 42 | 10 |
| Harrison | 256.6 | 117.9 | 1.3 | 137.4 | 54 | 11 |
| Holmes | 271.1 | 177.6 | — | 93.5 | 34 | 13 |
| Jefferson | 262.8 | 114.6 | .9 | 147.3 | 56 | 9 |
| Monroe | 291.8 | 108.0 | — | 183.8 | 63 | 8 |
| Muskingum | 427.0 | 251.4 | 1.5 | 174.1 | 41 | 9 |
| Noble | 255.0 | 139.3 | .9 | 114.8 | 45 | 12 |
| Tuscarawas | 364.2 | 207.9 | .5 | 155.8 | 43 | 10 |
| Total | 3,417.7 | 1,830.0 | 20.8 | 1,566.9 | 46 | 3 |

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## Table 67.—Continued

| County | Total land area[1] | Nonforest land area | Forest-land area | | |
| | | | Noncom- mercial[2] | Commercial | | Sampling error[3] |
| | 1,000 acres | 1,000 acres | 1,000 acres | 1,000 acres | Per- cent | Per- cent |

| County | Total land area[1] | Nonforest land area | Noncom- mercial[2] | Commercial (1,000 acres) | Commercial (Percent) | Sampling error[3] |
|---|---|---|---|---|---|---|
| | **NORTHEASTERN UNIT** | | | | | |
| Ashland | 271.1 | 226.1 | 1.0 | 44.0 | 16 | 28 |
| Ashtabula | 448.1 | 326.4 | 1.7 | 120.0 | 27 | 17 |
| Columbiana | 341.6 | 243.3 | 1.3 | 97.0 | 28 | 19 |
| Cuyahoga | 291.8 | 250.1 | — | 41.7 | 14 | 32 |
| Erie | 168.8 | 149.0 | .5 | 19.3 | 11 | 45 |
| Geauga | 260.5 | 174.6 | .9 | 85.0 | 33 | 25 |
| Huron | 318.0 | 273.0 | — | 45.0 | 14 | 29 |
| Lake | 148.0 | 104.6 | .9 | 42.5 | 29 | 38 |
| Lorain | 316.7 | 271.8 | 1.7 | 43.2 | 14 | 31 |
| Mahoning | 265.7 | 209.6 | 2.4 | 53.7 | 20 | 29 |
| Medina | 271.8 | 224.4 | — | 47.4 | 17 | 28 |
| Portage | 316.6 | 221.6 | 12.8 | 82.2 | 26 | 20 |
| Richland | 317.2 | 263.3 | .3 | 53.6 | 17 | 28 |
| Stark | 368.3 | 326.3 | — | 42.0 | 11 | 29 |
| Summit | 262.7 | 203.9 | — | 58.8 | 22 | 26 |
| Trumbull | 393.4 | 294.0 | 1.9 | 97.5 | 25 | 21 |
| Wayne | 358.9 | 311.5 | — | 47.4 | 13 | 25 |
| Total | 5,119.2 | 4,073.5 | 25.4 | 1,020.3 | 20 | 6 |
| | **WESTERN UNIT** | | | | | |
| Allen | 262.1 | 246.9 | .1 | 15.1 | 6 | 39 |
| Auglaize | 255.9 | 241.2 | .1 | 14.6 | 6 | 37 |
| Butler | 301.2 | 263.3 | .9 | 37.0 | 12 | 37 |
| Champaign | 276.5 | 255.7 | .4 | 20.4 | 7 | 46 |
| Clark | 257.3 | 244.4 | — | 12.9 | 5 | 39 |
| Clinton | 262.5 | 243.5 | 1.0 | 18.0 | 7 | 37 |
| Crawford | 258.6 | 236.5 | — | 22.1 | 9 | 41 |
| Darke | 387.1 | 364.7 | — | 22.4 | 6 | 31 |
| Defiance | 263.7 | 236.1 | .2 | 27.4 | 10 | 34 |
| Delaware | 287.7 | 266.4 | .5 | 20.8 | 7 | 44 |
| Fairfield | 323.0 | 286.3 | .5 | 36.2 | 11 | 31 |
| Fayette | 259.8 | 252.5 | — | 7.3 | 3 | 41 |
| Franklin | 344.1 | 326.9 | 1.3 | 15.9 | 5 | 35 |
| Fulton | 260.3 | 242.8 | .3 | 17.2 | 7 | 37 |
| Greene | 265.8 | 246.5 | .8 | 18.5 | 7 | 31 |
| Hamilton | 265.1 | 219.6 | 3.1 | 42.4 | 16 | 27 |
| Hancock | 340.3 | 317.1 | .1 | 23.1 | 7 | 33 |
| Hardin | 298.9 | 281.7 | — | 17.2 | 6 | 45 |
| Henry | 265.9 | 254.7 | — | 11.2 | 4 | 32 |
| Knox | 339.9 | 276.5 | — | 63.4 | 19 | 25 |

**CONTINUED**

Table 67.—Continued

| County | Total land area[1] | Nonforest land area | Forest-land area | | |
|---|---|---|---|---|---|
| | | | Noncom-mercial[2] | Commercial | | Sampling error[3] |
| | *1,000 acres* | *1,000 acres* | *1,000 acres* | *1,000 acres* | *Per-cent* | *Per-cent* |
| Licking | 439.0 | 375.1 | .8 | 63.1 | 14 | 27 |
| Logan | 294.5 | 268.0 | .3 | 26.2 | 9 | 46 |
| Lucas | 219.8 | 198.2 | — | 21.6 | 10 | 39 |
| Madison | 297.0 | 286.8 | .1 | 10.1 | 3 | 41 |
| Marion | 259.1 | 246.8 | .1 | 12.2 | 5 | 43 |
| Mercer | 290.7 | 275.7 | — | 15.0 | 5 | 36 |
| Miami | 260.3 | 248.9 | — | 11.4 | 4 | 40 |
| Montgomery | 293.4 | 274.3 | 1.4 | 17.7 | 6 | 41 |
| Morrow | 258.1 | 224.7 | .1 | 33.3 | 13 | 35 |
| Ottawa | 167.3 | 159.7 | .3 | 7.3 | 4 | 48 |
| Paulding | 266.9 | 248.6 | — | 18.3 | 7 | 28 |
| Pickaway | 324.5 | 310.4 | .7 | 13.4 | 4 | 36 |
| Preble | 273.5 | 249.4 | 2.0 | 22.1 | 8 | 45 |
| Putnam | 311.0 | 295.8 | — | 15.2 | 5 | 39 |
| Sandusky | 261.9 | 246.9 | — | 15.0 | 6 | 50 |
| Seneca | 352.6 | 328.9 | — | 23.7 | 7 | 38 |
| Shelby | 261.1 | 238.1 | .3 | 22.7 | 9 | 37 |
| Union | 277.8 | 259.6 | — | 18.2 | 7 | 33 |
| Van Wert | 261.8 | 252.3 | — | 9.5 | 4 | 38 |
| Warren | 261.1 | 231.8 | .1 | 29.2 | 11 | 37 |
| Williams | 269.3 | 241.7 | — | 27.6 | 10 | 36 |
| Wood | 396.3 | 383.0 | — | 13.3 | 3 | 40 |
| Wyandot | 259.8 | 241.4 | — | 18.4 | 7 | 37 |
| Total | 12,332.5 | 11,389.4 | 15.5 | 927.6 | 8 | 6 |
| All counties | 26,251.3 | 19,846.0 | 76.1 | 6,329.2 | 24 | 2 |

[1] Source: United States Bureau of the Census, Area Measurement Reports, Ohio, 1960, 1967.
[2] Productive-reserved forest land.
[3] In percent for commercial forest land, at the 68-percent probability level.

Table 68.—*Area of commercial forest land in Ohio, by ownership classes and by geographic units and counties, 1968*

(In thousands of acres)

| County | Public[1] | Private | Total |
|---|---|---|---|
| **SOUTH-CENTRAL UNIT** | | | |
| Adams | 16.3 | 170.6 | 186.9 |
| Brown | .8 | 76.0 | 76.8 |
| Clermont | — | 90.2 | 90.2 |
| Gallia | 4.8 | 154.3 | 159.1 |
| Highland | .9 | 81.1 | 82.0 |
| Jackson | 6.6 | 134.7 | 141.3 |
| Lawrence | 40.7 | 167.4 | 208.1 |
| Pike | 10.3 | 158.2 | 168.5 |
| Ross | 22.9 | 146.4 | 169.3 |
| Scioto | 59.6 | 199.9 | 259.5 |
| Total | 162.9 | 1,378.8 | 1,541.7 |
| **SOUTHEASTERN UNIT** | | | |
| Athens | 11.7 | 203.6 | 215.3 |
| Hocking | 28.2 | 168.6 | 196.8 |
| Meigs | 2.3 | 165.2 | 167.5 |
| Morgan | 4.5 | 110.4 | 114.9 |
| Perry | 18.8 | 114.1 | 132.9 |
| Vinton | 27.2 | 167.0 | 194.2 |
| Washington | 11.8 | 239.3 | 251.1 |
| Total | 104.5 | 1,168.2 | 1,272.7 |
| **EAST-CENTRAL UNIT** | | | |
| Belmont | 2.6 | 154.1 | 156.7 |
| Carroll | 3.1 | 110.0 | 113.1 |
| Coshocton | 5.2 | 143.0 | 148.2 |
| Guernsey | .8 | 141.4 | 142.2 |
| Harrison | 7.8 | 129.6 | 137.4 |
| Holmes | — | 93.5 | 93.5 |
| Jefferson | 3.6 | 143.7 | 147.3 |
| Monroe | 5.4 | 178.4 | 183.8 |
| Muskingum | 5.3 | 168.8 | 174.1 |
| Noble | 1.3 | 113.5 | 114.8 |
| Tuscarawas | 1.4 | 154.4 | 155.8 |
| Total | 36.5 | 1,530.4 | 1,566.9 |

CONTINUED

**Table 68.—Continued**

| County | Public | Private | Total |
|--------|--------|---------|-------|
| NORTHEASTERN UNIT | | | |
| Ashland | 4.4 | 39.6 | 44.0 |
| Ashtabula | .7 | 119.3 | 120.0 |
| Columbiana | 2.4 | 94.6 | 97.0 |
| Cuyahoga | — | 41.7 | 41.7 |
| Erie | 1.1 | 18.2 | 19.3 |
| Geauga | 3.7 | 81.3 | 85.0 |
| Huron | 1.3 | 43.7 | 45.0 |
| Lake | .2 | 42.3 | 42.5 |
| Lorain | .2 | 43.0 | 43.2 |
| Mahoning | 1.1 | 52.6 | 53.7 |
| Medina | .3 | 47.1 | 47.4 |
| Portage | 6.3 | 75.9 | 82.2 |
| Richland | 1.1 | 52.5 | 53.6 |
| Stark | 1.1 | 40.9 | 42.0 |
| Summit | .5 | 58.3 | 58.8 |
| Trumbull | 7.9 | 89.6 | 97.5 |
| Wayne | .5 | 46.9 | 47.4 |
| Total | 32.8 | 987.5 | 1,020.3 |
| WESTERN UNIT | | | |
| Allen | .1 | 15.0 | 15.1 |
| Auglaize | — | 14.6 | 14.6 |
| Butler | .1 | 36.9 | 37.0 |
| Champaign | .1 | 20.3 | 20.4 |
| Clark | — | 12.9 | 12.9 |
| Clinton | — | 18.0 | 18.0 |
| Crawford | — | 22.1 | 22.1 |
| Darke | .1 | 22.3 | 22.4 |
| Defiance | .2 | 27.2 | 27.4 |
| Delaware | — | 20.8 | 20.8 |
| Fairfield | — | 36.2 | 36.2 |
| Fayette | — | 7.3 | 7.3 |
| Franklin | — | 15.9 | 15.9 |
| Fulton | 1.3 | 15.9 | 17.2 |
| Greene | .8 | 17.7 | 18.5 |
| Hamilton | — | 42.4 | 42.4 |
| Hancock | — | 23.1 | 23.1 |
| Hardin | — | 17.2 | 17.2 |
| Henry | .9 | 10.3 | 11.2 |
| Knox | .7 | 62.7 | 63.4 |
| Licking | — | 63.1 | 63.1 |
| Logan | — | 26.2 | 26.2 |
| Lucas | 1.1 | 20.5 | 21.6 |

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Table 68.—Continued

| County | Public | Private | Total |
|---|---|---|---|
| Madison | — | 10.1 | 10.1 |
| Marion | .4 | 11.8 | 12.2 |
| Mercer | .1 | 14.9 | 15.0 |
| Miami | — | 11.4 | 11.4 |
| Montgomery | .1 | 17.6 | 17.7 |
| Morrow | .2 | 33.1 | 33.3 |
| Ottawa | 1.6 | 5.7 | 7.3 |
| Paulding | — | 18.3 | 18.3 |
| Pickaway | .2 | 13.2 | 13.4 |
| Preble | .9 | 21.2 | 22.1 |
| Putnam | — | 15.2 | 15.2 |
| Sandusky | .1 | 14.9 | 15.0 |
| Seneca | .1 | 23.6 | 23.7 |
| Shelby | — | 22.7 | 22.7 |
| Union | — | 18.2 | 18.2 |
| Van Wert | — | 9.5 | 9.5 |
| Warren | .4 | 28.8 | 29.2 |
| Williams | .1 | 27.5 | 27.6 |
| Wood | — | 13.3 | 13.3 |
| Wyandot | 1.4 | 17.0 | 18.4 |
| Total | 11.0 | 916.6 | 927.6 |
| All counties | 347.7 | 5,981.5 | 6,329.2 |

[1] From ownership records.

(In millions of cubic feet)

| County | Softwoods | Hardwoods | Total | Sampling error of total (percent) |
|---|---|---|---|---|
| SOUTH-CENTRAL UNIT | | | | |
| Adams | 6.6 | 123.9 | 130.5 | 8 |
| Brown | 2.6 | 41.6 | 44.2 | 16 |
| Clermont | 3.0 | 71.3 | 74.3 | 11 |
| Gallia | 5.4 | 99.7 | 105.1 | 11 |
| Highland | 2.5 | 52.5 | 55.0 | 14 |
| Jackson | 4.8 | 99.1 | 103.9 | 10 |
| Lawrence | 8.7 | 153.5 | 162.2 | 9 |
| Pike | 5.8 | 128.4 | 134.2 | 9 |
| Ross | 5.9 | 130.4 | 136.3 | 9 |
| Scioto | 8.8 | 197.9 | 206.7 | 7 |
| Total | 54.1 | 1,098.3 | 1,152.4 | 2 |
| SOUTHEASTERN UNIT | | | | |
| Athens | 4.6 | 139.5 | 144.1 | 9 |
| Hocking | 5.0 | 131.2 | 136.2 | 9 |
| Meigs | 3.0 | 113.2 | 116.2 | 9 |
| Morgan | 2.4 | 62.4 | 64.8 | 12 |
| Perry | 3.5 | 78.0 | 81.5 | 13 |
| Vinton | 3.6 | 137.9 | 141.5 | 8 |
| Washington | 5.5 | 159.4 | 164.9 | 8 |
| Total | 27.6 | 821.6 | 849.2 | 2 |
| EAST-CENTRAL UNIT | | | | |
| Belmont | 2.9 | 88.9 | 91.8 | 11 |
| Carroll | 1.9 | 61.5 | 63.4 | 15 |
| Coshocton | 2.6 | 82.4 | 85.0 | 12 |
| Guernsey | 2.6 | 75.5 | 78.1 | 13 |
| Harrison | 2.3 | 59.3 | 61.6 | 16 |
| Holmes | 1.6 | 58.8 | 60.4 | 15 |
| Jefferson | 2.8 | 85.5 | 88.3 | 12 |
| Monroe | 3.8 | 110.3 | 114.1 | 11 |
| Muskingum | 3.2 | 99.0 | 102.2 | 11 |
| Noble | 2.0 | 53.0 | 55.0 | 16 |
| Tuscarawas | 2.7 | 82.6 | 85.3 | 13 |
| Total | 28.4 | 856.8 | 885.2 | 3 |

Table 69.—Continued

| County | Softwoods | Hardwoods | Total | Sampling error of total (percent) |
|---|---|---|---|---|
| NORTHEASTERN UNIT | | | | |
| Ashland | .2 | 30.0 | 30.2 | 38 |
| Ashtabula | .6 | 81.4 | 82.0 | 26 |
| Columbiana | .6 | 62.4 | 63.0 | 28 |
| Cuyahoga | 1 | 25.1 | 25.2 | 42 |
| Erie | .1 | 11.1 | 11.2 | 35 |
| Geauga | .3 | 51.4 | 51.7 | 37 |
| Huron | .2 | 27.5 | 27.7 | 40 |
| Lake | .2 | 28.8 | 29.0 | 61 |
| Lorain | .1 | 24.2 | 24.3 | 47 |
| Mahoning | .3 | 34.3 | 34.6 | 42 |
| Medina | .2 | 28.0 | 28.2 | 40 |
| Portage | .4 | 52.3 | 52.7 | 26 |
| Richland | .1 | 24.9 | 25.0 | 45 |
| Stark | .2 | 24.8 | 25.0 | 38 |
| Summit | .2 | 33.8 | 34.0 | 39 |
| Trumbull | .3 | 58.6 | 58.9 | 32 |
| Wayne | .4 | 33.8 | 34.2 | 31 |
| Total | 4.5 | 632.4 | 636.9 | 6 |
| WESTERN UNIT | | | | |
| Allen | — | 11.6 | 11.6 | 50 |
| Auglaize | — | 11.3 | 11.3 | 45 |
| Butler | .1 | 16.4 | 16.5 | 53 |
| Champaign | .1 | 10.8 | 10.9 | 46 |
| Clark | — | 9.5 | 9.5 | 45 |
| Clinton | — | 14.2 | 14.2 | 51 |
| Crawford | — | 17.0 | 17.0 | 49 |
| Darke | — | 16.8 | 16.8 | 35 |
| Defiance | — | 21.9 | 21.9 | 45 |
| Delaware | .1 | 10.8 | 10.9 | 58 |
| Fairfield | .1 | 29.2 | 29.3 | 40 |
| Fayette | — | 4.2 | 4.2 | 35 |
| Franklin | — | 10.5 | 10.5 | 44 |
| Fulton | — | 15.1 | 15.1 | 48 |
| Greene | — | 13.6 | 13.6 | 38 |
| Hamilton | .1 | 32.1 | 32.2 | 32 |
| Hancock | — | 18.0 | 18.0 | 42 |
| Hardin | — | 13.8 | 13.8 | 60 |
| Henry | — | 9.1 | 9.1 | 39 |

Table 69.—Continued

| County | Softwoods | Hardwoods | Total | Sampling error of total (percent) |
|---|---|---|---|---|
| Knox | .1 | 43.2 | 43.3 | 30 |
| Licking | .1 | 37.9 | 38.0 | 35 |
| Logan | .1 | 17.1 | 17.2 | 58 |
| Lucas | — | 14.2 | 14.2 | 39 |
| Madison | .1 | 5.7 | 5.8 | 32 |
| Marion | — | 9.2 | 9.2 | 55 |
| Mercer | — | 11.7 | 11.7 | 47 |
| Miami | — | 8.4 | 8.4 | 48 |
| Montgomery | — | 12.2 | 12.2 | 51 |
| Morrow | .1 | 23.9 | 24.0 | 42 |
| Ottawa | — | 3.4 | 3.4 | 37 |
| Paulding | — | 15.7 | 15.7 | 38 |
| Pickaway | — | 10.3 | 10.3 | 53 |
| Preble | .1 | 13.4 | 13.5 | 53 |
| Putnam | — | 12.5 | 12.5 | 54 |
| Sandusky | — | 9.0 | 9.0 | 54 |
| Seneca | — | 18.3 | 18.3 | 51 |
| Shelby | — | 16.8 | 16.8 | 46 |
| Union | — | 14.8 | 14.8 | 43 |
| Van Wert | — | 6.6 | 6.6 | 54 |
| Warren | .1 | 20.1 | 20.2 | 49 |
| Williams | .1 | 22.2 | 22.3 | 45 |
| Wood | — | 8.5 | 8.5 | 41 |
| Wyandot | — | 14.9 | 14.9 | 49 |
| Total | 1.3 | 655.9 | 657.2 | 6 |
| All counties | 115.9 | 4,065.0 | 4,180.9 | 2 |

| County | Softwoods | Hardwoods | Total | Sampling error of total (percent) |
|---|---|---|---|---|
| **SOUTH-CENTRAL UNIT** | | | | |
| Adams | 22.3 | 400.8 | 423.1 | 10 |
| Brown | 7.8 | 130.5 | 138.3 | 20 |
| Clermont | 11.1 | 243.1 | 254.2 | 13 |
| Gallia | 17.7 | 316.3 | 334.0 | 14 |
| Highland | 8.7 | 170.9 | 179.6 | 18 |
| Jackson | 17.0 | 330.2 | 347.2 | 12 |
| Lawrence | 28.4 | 516.3 | 544.7 | 12 |
| Pike | 22.0 | 425.9 | 447.9 | 11 |
| Ross | 21.2 | 438.0 | 459.2 | 12 |
| Scioto | 32.4 | 653.3 | 685.7 | 9 |
| Total | 188.6 | 3,625.3 | 3,813.9 | 3 |
| **SOUTHEASTERN UNIT** | | | | |
| Athens | 13.7 | 492.1 | 505.8 | 11 |
| Hocking | 15.1 | 455.2 | 470.3 | 12 |
| Meigs | 8.8 | 401.6 | 410.4 | 12 |
| Morgan | 6.0 | 214.7 | 220.7 | 16 |
| Perry | 9.3 | 273.0 | 282.3 | 16 |
| Vinton | 11.2 | 484.0 | 495.2 | 10 |
| Washington | 15.7 | 552.5 | 568.2 | 10 |
| Total | 79.8 | 2,873.1 | 2,952.9 | 3 |
| **EAST-CENTRAL UNIT** | | | | |
| Belmont | 7.4 | 310.4 | 317.8 | 14 |
| Carroll | 4.6 | 208.5 | 213.1 | 19 |
| Coshocton | 6.4 | 289.0 | 295.4 | 15 |
| Guernsey | 6.2 | 262.5 | 268.7 | 16 |
| Harrison | 4.4 | 197.7 | 202.1 | 20 |
| Holmes | 4.5 | 208.4 | 212.9 | 18 |
| Jefferson | 7.3 | 298.6 | 305.9 | 15 |
| Monroe | 10.1 | 383.3 | 393.4 | 14 |
| Muskingum | 8.2 | 341.8 | 350.0 | 14 |
| Noble | 4.2 | 179.2 | 183.4 | 21 |
| Tuscarawas | 6.5 | 283.9 | 290.4 | 16 |
| Total | 69.8 | 2,963.3 | 3,033.1 | 3 |

Table 70.—Continued

| County | Softwoods | Hardwoods | Total | Sampling error of total (percent) |
|---|---|---|---|---|
| NORTHEASTERN UNIT | | | | |
| Ashland | .6 | 104.4 | 105.0 | 48 |
| Ashtabula | 1.5 | 280.6 | 282.1 | 33 |
| Columbiana | 1.4 | 215.5 | 216.9 | 36 |
| Cuyahoga | .4 | 85.0 | 85.4 | 54 |
| Erie | .1 | 39.4 | 39.5 | 40 |
| Geauga | .8 | 174.3 | 175.1 | 47 |
| Huron | .6 | 95.8 | 96.4 | 51 |
| Lake | .5 | 99.1 | 99.6 | 77 |
| Lorain | .1 | 79.6 | 79.7 | 61 |
| Mahoning | .7 | 119.0 | 119.7 | 54 |
| Medina | .5 | 95.6 | 96.1 | 51 |
| Portage | 1.0 | 183.1 | 184.1 | 33 |
| Richland | .3 | 81.0 | 81.3 | 59 |
| Stark | .6 | 86.0 | 86.6 | 49 |
| Summit | .6 | 115.0 | 115.6 | 50 |
| Trumbull | .7 | 197.9 | 198.6 | 41 |
| Wayne | .9 | 120.9 | 121.8 | 38 |
| Total | 11.3 | 2,172.2 | 2,183.5 | 7 |
| WESTERN UNIT | | | | |
| Allen | — | 46.6 | 46.6 | 59 |
| Auglaize | — | 44.5 | 44.5 | 47 |
| Butler | — | 63.2 | 63.2 | 60 |
| Champaign | — | 42.5 | 42.5 | 50 |
| Clark | — | 37.5 | 37.5 | 47 |
| Clinton | — | 55.9 | 55.9 | 59 |
| Crawford | — | 67.4 | 67.4 | 57 |
| Darke | — | 65.1 | 65.1 | 40 |
| Defiance | — | 86.7 | 86.7 | 54 |
| Delaware | — | 41.9 | 41.9 | 63 |
| Fairfield | — | 114.7 | 114.7 | 49 |
| Fayette | — | 16.1 | 16.1 | 41 |
| Franklin | — | 41.3 | 41.3 | 52 |
| Fulton | — | 58.9 | 58.9 | 57 |
| Greene | — | 52.5 | 52.5 | 43 |

Table 70.—Continued

| County | Softwoods | Hardwoods | Total | Sampling error of total (percent) |
|---|---|---|---|---|
| Hamilton | — | 123.3 | 123.3 | 35 |
| Hancock | — | 70.5 | 70.5 | 51 |
| Hardin | — | 53.4 | 53.4 | 67 |
| Henry | — | 36.5 | 36.5 | 51 |
| Knox | — | 173.6 | 173.6 | 38 |
| Licking | — | 144.7 | 144.7 | 41 |
| Logan | — | 66.4 | 66.4 | 66 |
| Lucas | — | 55.8 | 55.8 | 42 |
| Madison | — | 22.7 | 22.7 | 36 |
| Marion | — | 34.9 | 34.9 | 60 |
| Mercer | — | 47.0 | 47.0 | 57 |
| Miami | — | 32.6 | 32.6 | 52 |
| Montgomery | — | 45.6 | 45.6 | 56 |
| Morrow | — | 93.9 | 93.9 | 50 |
| Ottawa | — | 12.5 | 12.5 | 44 |
| Paulding | — | 60.6 | 60.6 | 46 |
| Pickaway | — | 40.5 | 40.5 | 61 |
| Preble | — | 52.0 | 52.0 | 57 |
| Putnam | — | 49.6 | 49.6 | 62 |
| Sandusky | — | 34.9 | 34.9 | 63 |
| Seneca | — | 72.7 | 72.7 | 59 |
| Shelby | — | 65.3 | 65.3 | 54 |
| Union | — | 58.4 | 58.4 | 52 |
| Van Wert | — | 25.5 | 25.5 | 58 |
| Warren | — | 79.5 | 79.5 | 57 |
| Williams | — | 88.5 | 88.5 | 54 |
| Wood | — | 33.7 | 33.7 | 44 |
| Wyandot | — | 58.8 | 58.8 | 57 |
| Total | — | 2,568.2 | 2,568.2 | 7 |
| All counties | 349.5 | 14,202.1 | 14,551.6 | 1 |

[1] International 1/4-inch rule.

THE MAJOR FOREST TYPES OF OHIO
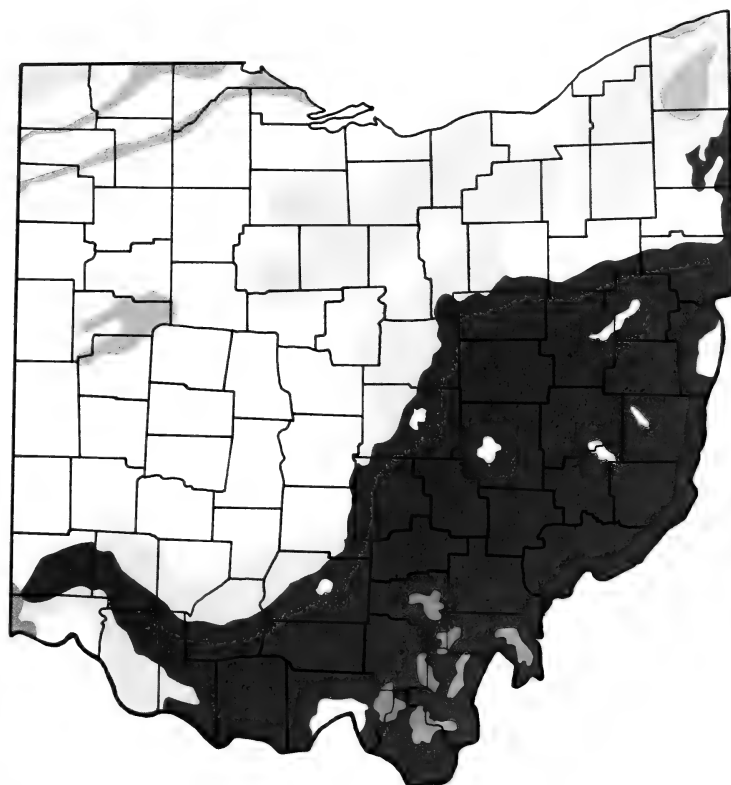
VIRGINIA – PITCH PINE

OAK – PINE

OAK – HICKORY

OAK – GUM

ELM – ASH – RED MAPLE

MAPLE – BEECH – BIRCH

NONFOREST

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# INDEX OF TABLES

## State

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## Geographic Units

## County

THE· FOREST SERVICE of the U. S. Depart-
ment of Agriculture is dedicated to the principle of
multiple use management of the Nation's forest re-
sources for sustained yields of wood, water, forage,
wildlife, and recreation. Through forestry research,
cooperation with the States and private forest
owners, and management of the National Forests
and National Grasslands, it strives — as directed
by Congress — to provide increasingly greater
service to a growing Nation.